

FINAL



WETLAND USE AND REGULATION: ALASKA CASE STUDY

January 31, 1983

This report is one of ten regional case studies that was funded by the Office of Technology Assessment(OTA) of the U.S. Congress for use in its study, "Wetlands: Their Use and Regulation." Because of regional variations in wetlands use throughout the United States, the findings made in this report may not reflect national trends that are described in the OTA report. This report has neither been reviewed nor approved by OTA's Technology Assessment Board.

The draft report, upon which this final report is based, was prepared by ESA/Madrone, Environmental Consultants. After receiving this draft material OTA rewrote the introduction to clarify the intent of the study and reorganized some of the material in the latter chapters of the report. To provide an objective and balanced overview of the use and regulation of wetlands in Alaska, OTA also deleted some material on the wildlife values associated with Alaska's wetlands, thereby eliminating a pro-wetlands bias.

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EXECUTIVE SUMMARY

INTRODUCTION TO THE STUDY

The Office of Technology Assessment (OTA) of the United States Congress undertook a comprehensive study of regional and national trends in the use of wetlands, the impacts of these uses on wetland values, and the effect of present Federal programs and policies on the management of wetlands. Alaska is one of ten regions in the United States selected for study of past and present distribution of wetlands and the factors which have influenced their disposition.

OTA's report to Congress in 1983 will synthesize the results of the regional case studies and other components of OTA's assessment, providing Congress with background information for scheduled reauthorization of the Clean Water Act (CWA). The CWA Section 404 regulatory program, exercised by EPA and the U.S. Army Corps of Engineers throughout the United States, has engendered controversy in Alaska and elsewhere, in both procedure and substance; questions have also been raised as to the appropriateness of its mission as a regulatory program and the limitation of its jurisdictional coverage.

WETLAND USES: PAST AND PRESENT

The six regions of Alaska, Arctic, Northwest, Yukon, Southwest, Southcentral and Southeast all contain large acreages of wetlands. Alaska has retained the vast majority of its wetlands. These habitats help to support the wildlife and fish upon which the Alaskan fishing industry and many residents depend.

Alaskan wetlands, in contrast to many states, are not easily defined. Vegetation adapted to the harsh climate of the north blankets the landscape, often without noticeable differences between wetland and non-wetland areas. Based upon vegetation types, the boundaries of wetlands and non-wetlands are consequently difficult to define. An examination of soil conditions and hydrology is often required to determine whether certain areas are wetlands.

To a large extent these wetlands are unstudied for their vegetative characters and boundaries, ecological importance, and wildlife inhabitants. The Arctic plain and south central area represent an exception to this rule; development there has initiated several important research projects.

TABLE 2
POTENTIAL AREA OF WETLANDS IN ALASKA

by Region

REGION	TOTAL LAND AREA OF REGION (MILLION ACRES)	PERCENT OF TOTAL STATE AREA	TOTAL AREA POTENTIALLY WETLANDS (MILLION ACRES)	TUNDRA AREA POTENTIALLY WETLANDS (MILLION ACRES)	PERCENT OF EACH REGION POTENTIALLY COVERED BY WETLANDS	PERCENT OF TOTAL POTENTIAL WETLAND AREAS OF STATE WITHIN REGION	PERCENT OF THE TOTAL AREA OF STATE POTENTIALLY WETLANDS
Arctic	48.9	13	37.2	33.4	76.2	16.7	9.6
Northwest	78.1	20	52.4	18.5	67.2	23.5	13.5
Southwest	67.2	17	40.3	24.7	60.0	18.1	10.4
Yukon	123.2	32	60.3	13.3	49.0	27.0	15.6
Southcentral	45.4	12	16.4	6.3	36.1	7.4	4.2
Southeastern	24.4	6	16.4	1.4	67.2	7.4	4.2
Total for State	387.2		223.0	97.6			57.5%

Source: Alaska District, U.S. Army Corps of Engineers 1982

Ten vegetative communities occur in the state and each may potentially be a wetland based upon hydric soils and hydrologic conditions. Table 2 summarizes the potential acreage of wetland for the various regions of the state. Overall, 223 million acres or nearly 58% of the total state area may be wetland. Of this figure, 97.6 million acres (43%) is some form of tundra.

Basically wetlands are of two types - coastal and freshwater. The latter is of greater distribution and area in the state and characterized by eight of the vegetation communities. Freshwater wetlands occupy margins of floodplains (the Matanuska-Susitna River lowlands, Koyukuk River Flats); vast reaches of wet and moist tundra (Arctic coastal plain); river flatlands and backwaters (Yukon Flats, Noatak, Kobuk, Selanik River lowlands); lake studded regions (Kenai Peninsula, Bristol Bay, Nelchina wetlands); and boggy lowlands (Anchorage Bowl). Coastal marshes, much smaller in extent, are tucked in along the 33,000 miles of Alaskan coastline. Swampy coastal lowlands such as the Yukon-Kuskokwim Delta and Copper River Delta, upper margins of estuarine fiords and tidal lagoons in the arctic and western regions host coastal marshes.

Migratory waterfowl and shorebirds use the freshwater and coastal marshes in the north and west of the state for nesting and rearing their young. The marshes of the southcentral and southeast areas serve as staging and resting habitat. Over 13 million waterfowl migrate to Alaska each year and an equally large number of shorebirds. Additionally, wetlands serve as feeding areas for juvenile fish, salmon in particular, which comprise the multimillion dollar Alaskan fishing industry. Unadulterated streams and wetlands are needed habitat for salmon and other fish species. Caribou, which range in several herds over much of the state, feed on moist and alpine tundra lichens in addition to other plants and utilize wet tundra and river lowlands as calving grounds and refuges from summer insect harassment. The caribou complete irregular migrations requiring large areas in which to range without depleting their food source. Moose and furbearer species forage in river and bog wetlands. The subsistence value of these wildlife is not quantifiable; native village culture and the livelihood of many residents depend on the continued abundance of these animals.

In addition to their natural values, Alaskan wetlands are also valued for their development potential, particularly for the oil and mineral reserves that lie beneath them. The need to develop domestic U.S. oil and gas reserves, for instance, in a time of dependence upon foreign oil imports has been a constant theme in the Alaskan oil industry. The Prudhoe Bay-Kuparuk fields contained approximately 10.8 billion barrels of recoverable oil reserves, much of it overlain by wetlands. This amount of oil is of significance to the U.S. and Alaskan economy and continued exploration may produce additional reserves. The state of Alaska in 1982 received \$3,096,230 in revenues from its oil leases. (DNR, 1982) Development has been slow to reach Alaska and

concentrated in the Southeastern and Southcentral regions and a small portion of the Arctic region. Oil and gas development in the 400 square mile Prudhoe Bay and Kuparuk Fields has filled approximately 1.2 - 4.5% of the field. The Kenai Peninsula has also been developed for oil extraction. The Trans-Alaska Pipeline cuts an 800-mile corridor down the length of the state and passes through wetlands along portions of its route. The impacts of oil and gas field and pipeline development on caribous and other wildlife are uncertain and controversial. The controversy over the effect on caribou of oil field activities and construction affords an example. Some biologists, such as the Alaska Department of Fish and Game, feel mothers and calves avoid the facilities and the developments have removed these areas as an integral portion of the Central Arctic herd's range. Other biologists refute this conclusion as unsubstantiated by quantitative evidence. They believe the caribou continue to use wetland areas near the field facilities.

Urban and highway construction in the Anchorage Bowl and other southcentral and southeast cities has necessitated wetland filling. Placer and lode mining throughout the state, but particularly in the Yukon area, have affected wetlands. For example, several locales, the Minto Flats and Nome terrace beaches, have experienced wetland losses due to sedimentation from upstream placer mining. Overall, however, vast stretches of wetlands in Alaska remain undeveloped.

Proposed projects in wetland areas are of several types: oil and gas development in both the Arctic Region and others; mineral development and accompanying road construction on both large and small scales; continued urban growth in cities and towns of the Southeast and Southcentral regions; hydroelectric developments located in the Southcentral, Southwest and Southeast Regions; and construction of log transfer sites and small boat harbors.

Future oil and gas development centers in 1) the Kuparuk field and offshore Beaufort Sea leases; 2) expanded leasing and exploration in the National Petroleum Reserve Alaska and other areas of the state including Bristol Bay, Bethel area and upper Yukon; 3) possible exploration and development in the Arctic National Wildlife Refuge. The exploration and development of oil resources is both a national and Alaskan goal to promote energy self-sufficiency in the United States. In addition the State of Alaska received over three million dollars in revenues from oil development and additional tax monies from associated businesses. Many of these future development centers have oil reservoirs which are located beneath wetland and tundra areas. Offshore development usually requires on-shore facilities, also in wetland areas. The extraction of the subsurface resource requires a degree of surface disturbance.

Large proposed mining operations include Red Dog Mine near Kotzebue; Beluga coal field near Anchorage; U.S. Borax molybdenum mine and Green Creek mine in the southeast; various sand and gravel operations and the Bering River coal fields. These projects would require road and facility construction and direct removal of wetlands.

In general neither the type nor location of wetlands relate to the degree and type of development in Alaska. Oil and gas development coincides with subsurface resources as does mining and sand and gravel extraction. Urban growth is concentrated on the narrow band of lowlands crouched between the mountains and ocean of the southcentral and southeast. The amount of farmland in these regions is limited; wetlands within city boundaries have become prime real estate.

REGULATION OF WETLANDS

The federal government regulates Alaskan wetlands in two ways: management of large wetland areas within National Wildlife Refuges, National Forests and National Parks and Monuments, and through the Section 404 permit program administered by the Alaska District of the Corps. Under the Alaska National Interest Lands Act, several large wetland areas were designated a part of several conservation land units including: Yukon Flats, Yukon Delta, Arctic, Kenai, Selawik, Koyukuk and Kanuti, Innoko and Nowitna National Wildlife Refuges and Bering Land Bridge National Monument and Chugush National Forest. The federal land management agencies responsible for these lands are currently preparing land use plans which will specify allowable oil and gas and mining activities in these wetlands compatible with their natural features. All these agencies are subject to Executive Order 11990 which encourages protection of wetlands on federal lands.

The Corps has the broadest jurisdiction and regulatory power over wetlands in Alaska. Both U. S. Fish and Wildlife Service and the National Marine Fisheries Service, under the Fish and Wildlife Coordination Act, and the Environmental Protection Agency, take an active interest in the implementation of the program. While most permit decisions are resolved at the district level, the U.S. Fish and Wildlife Service has prompted elevations of some Corps permit decisions.

Alaska state programs affecting wetlands are of two types: those which act through the 404 program and related laws, and those which regulate particular types of activities such as oil, gas and mineral extraction. The state maintains an approved Coastal Management Program; its expression is through consistency determinations on 404 permits and other federal or state actions. Other state agencies,

such as the Department of Fish and Game, also comment on these determinations, and the Division of Planning and Policy Development balances various concerns for the final decision. In the absence of a consistent project determination, the Corps will not issue a permit. Similarly, the state 401 certification, managed by Department of Environmental Conservation, must also be approved prior to 404 permit issuance.

Other state regulatory programs of importance to wetlands are Anadromous Fish Habitat Protection permits administered by Fish and Game for alterations to streambeds, and the oil and gas leases and plans of operation issued by the Division of Minerals and Energy Management of the Department of Natural Resources. A state lease sale tract is large and lease stipulations tend to be broad and general; DMEM is considering a set of standard stipulations to be applied to all oil and gas leases which attempt to reduce disruption of wetlands. The plan of operation is required for any activity within a state lease area. This plan is site specific to a particular project and duplicates the 404 program in the conditions required and state agency review. However, several distinctions exist between the two programs: 1) the DMEM plan of operation is not given public nor local government review, but, instead, four state agencies lend comments and conditions. DMEM currently has no codified set of regulations or policies specifying the method and criteria for review of plans and balancing of development with resource conservation. No public interest review is required. 2) DMEM is the Alaska state agency with primary responsibility for overseeing the development of state oil and gas resources and accounting for state lease revenues. 3) The DMEM program applies only to state oil and gas lease lands.

Local governments in several instances have taken an active role in wetland regulation, either through their own zoning powers or coastal planning combined with Corps general permits.

EFFECTS OF THE CORPS' REGULATORY PROGRAM

Effects must be viewed from both the standpoint of the regulated and the protection of the wetland resource. As demonstrated by various testimony, applicants are not unanimous in their feelings towards the 404 program. Many consider the program an invasion of private property rights. The oil and gas industry has expressed opposition to the program based upon the Corps' broad jurisdiction over tundra, time delays and permit conditions. Other applicants have had worthwhile experiences cooperating with local government in wetlands planning. Amongst those proponents of the program are several conservation groups, the State of Alaska, United Fishermen of Alaska, the Municipality of Anchorage and the North Slope Borough.

The role of the regulatory system in protecting Alaskan wetlands is defined by two basic factors: the inherent authority and jurisdictional limitations of the programs dealing with regional wetlands issues; and the operation of the 404 program by the Alaska District. Despite their jurisdictional authority, for instance, the Corps has not regulated placer mining, a widespread activity in floodplain areas of the state. No other major activities affecting wetlands or particular geographic areas of wetlands are unregulated. Table ii summarizes the major wetland issues in Alaska and their regulation.

In general, the Alaska District's program has several problem areas, some of which extend to all regulatory programs in the state. The data base on wetland types, distribution and inherent values, is very limited and often inadequate for immediate decision making on permit applications. Wetland determinations in many regions require site visits. Climatic conditions in Alaska can be extreme; travel and field work and ultimately permit issuance are often curtailed during winter months.

In addition, the district often avoids the position of arbitrator needed to facilitate and occasionally resolve problems. However, the district has been involved in local planning to encourage general permit issuance, cooperated in publicizing the program and attempted to improve processing times. The Corps' enforcement program represents a weak link in the system; additional staff and budget, as well as, a workable legal approach to violations is needed.

The permit case histories examined several types of development: urban growth, oil and gas development, hard rock mining, log transfer sites and sand and gravel mining. Review of projects by the Corps and the resource agencies is similar for development throughout the State despite differences in regional location, project size and the types of wetlands affected. Mitigation and permit conditions appended to 404 permits appeared to be applied evenly statewide, with no stricter requirements placed on particular types of development.

The case histories point out several problems with the 404 permit program: The lack of overall wetland/development planning in particular areas of the state (arctic, southeast, southwest, northwest, and Yukon) results in difficulties with project review, assessing cumulative wetland impacts and predictability in the permit process. Despite efforts on the part of oil companies to address overall facility siting on the North Slope, the protection of proprietary information regarding oil development, continuously changing nature of field development and engineering and outside economic effects, have precluded the completion of a facility plan. Instead, a state and federal wetland resource plan outlining and prioritizing important and developable wetland areas and required mitigation measures for devel-

TABLE ii

SUMMARY OF REGULATORY PROGRAMS AFFECTING WETLANDS IN ALASKA

REGION	TYPE OF ACTIVITY	TYPE OF WETLAND AFFECTED	PRIMARY REGULATORY AGENCIES	REGULATION/REVIEW PROCESS	ISSUES OF CONCERN
South Central	residential, commercial, industrial development	lowland spruce, low brush-bog muskeg, tidelands, coastal marsh	Army Corps DPDP/OCM DEC	Individual 404 permits coastal plan or coastal standards - consistency determination water quality standards - 401 certification	- Applicant concerns over time delays, restrictions on development of wetland parcels, increased costs to developer - Resource agency concerns over loss of wildlife habitat, degradation of anadromous fishery habitat, water dependency of project - Water quality effects from loss of wetland acreages
Municipality of Anchorage	residential and commercial development	lowland black spruce, bog-muskeg, freshwater marshes	Army Corps DPDP/OCM DEC	general permit being processed as based on delineations in Anchorage Wetland Plan for development, conservation, and preservation of wetlands	- Cooperative planning between applicants, state, and federal resource agencies; Corps and municipality of Anchorage have resolved many issues
Kenai River (including 11,000 acres of wetlands at mouth)	recreational, residential development	coastal marsh, freshwater marsh, black spruce bog-muskeg	Army Corps DPDP/OCM DEC	Individual 404 permits; many are being held in abeyance pending completion of resource studies	- Lack of conformance with Kenai River Review - Cumulative impacts on sport fishery resources and Cook Inlet commercial fishery - Kenai Borough uncooperative in completing resource planning for coastal management plan with Fish and Game and other agencies - Applicant concerns over inability to develop their wetlands and riverfront property
Southeast	log transfer facilities	tidelands, coastal marsh	Army Corps DPDP/OCM	404/10 individual permit; pre-planning between U.S. Forest Service and other logging corporations and the USFWS coastal planning, consistency determinations	- Fishery resources - facilities are usually designed in areas away from streams - Tideland filling - Disturbance to bald eagle nests

TABLE 22 (continued)

REGION	TYPE OF ACTIVITY	TYPE OF WETLAND AFFECTED	PRIMARY REGULATORY AGENCIES	REGULATION/REVIEW PROCESS	ISSUES OF CONCERN
Southeast (continued)	mining development (Quartz Hill mine, only example)	tidelands, coastal marsh, freshwater marsh types, black spruce bog-muskeg	DEC	401 certification	- Bark build up on tidelands from in-water log storage
			DNR	tideland leases or rights-of-way	- Delays in timber sales resulting from delayed 404 processing
			Army Corps	404 individual permit; U.S. Forest EIS review; cooperative advisory team composed of Corps, resource agencies, local government; Corps environmental review	- Long-term impacts of exploration and development activities on fishery and wildlife resources, recreational use of surrounding lands
			U.S. Forest Service DPRP/DCM	use permit, mining plan of operation consistency determination, local coastal management plans	- Safety and economic consideration of mine development
North Boroughs	residential and commercial development	tideland, coastal marsh, some freshwater marsh types	DEC	401 certification	- Effects of discharge of mine tailings upon fishery habitat
			EPA	NPDES permit	
			DNR	tideland leases	
			Army Corps	Individual 404 permits	- Resource agency concerns over effects on fishery resources and wildlife habitats
City and Borough of Sitka	residential and commercial development	tideland, coastal marsh, some freshwater marsh types	Army Corps DPRP/DCM DEC	general permit issued for several categories of activities based upon policies in Coastal Management Plan (CMP)	- Resource and applicant issues addressed in CMP
				Interim after-the-fact 404 permit issued for three years; current planning for resolution of mining operation with resource issues	- Long-term effect of gravel removal on stream hydrology and fish habitat
			Army Corps DPRP/DCM	401 certification with monitoring program	- Turbidity and water quality effects
			DEC	general permit I, II, III for relatively minor projects; individual 404 permit for major projects	- Applicant concerns over time delays, cost of mitigation measures, duplication of permit reviews
Juneau Area	sand and gravel mining	freshwater wetlands, stream channel	Army Corps DPRP/DCM		
Arctic	oil and gas exploration and development including placement of gravel for drilling pad, pipelines, facilities, and roads, disposal of drilling mud	wet and moist tundra, coastal marsh	Army Corps		

TABLE 2.2 (continued)

REGION	TYPE OF ACTIVITY	TYPE OF WETLAND AFFECTED	PRIMARY REGULATORY AGENCIES	REGULATION/REVIEW PROCESS	ISSUES OF CONCERN
Arctic (continued)	oil and gas exploration (continued)		DEC DPDP/OCM DFG DNR/BLM North Slope Borough	401 certification coastal consistency determination anadromous fish stream (Title 14) permit oil lease and plan of operation zoning permit	- Resource agency concern over wetland loss, effect of pipeline height and disturbance on caribou, loss of waterfowl habitat, effects of road dust on wetlands, disposal of drilling mud - Maintenance of hydrologic character of wetland, avoiding thermal erosion of permafrost, disruption and loss of anadromous fish in rivers and shoreline habitat - Local concern over subsistence hunting and fishing values - DNR/BLM concern over facilitating energy development and production without significant environmental harm
Southwest Northwest Yukon	most development activities including residential and commercial, oil and gas development; proposed mining exploration	most types	Army Corps DNR/BLM	individual 404 permit oil, gas or mineral lease and plan of operation	- Issues determined for each project; development in these regions is not a great concern at this time
Yukon and Other Regions	placer mining and associated road building	unknown; usually fresh-water marsh types, and tundra types	EPA DEC	NPDES permit 401 certification	- Water quality concerns primary, regulated discharge of effluent, not discharge of fill onto adjacent wetlands - No 404 permit regulation of this activity despite legal jurisdiction - Modification of channel and in-stream habitat for fish
All Regions	federal and state funded residential development in rural villages	many types throughout state	DFG Army Corps	anadromous fish stream permit general permits covering 13 state housing authority regions	- Avoid valuable wetland to greatest degree possible, maintain drainage patterns

opment could facilitate permit processing in a predictable fashion with a broader use of general permits. Proposed large-scale mining development in some remote regions is currently in the pre-application planning process, and overall wetland planning may be appropriate for these areas also.

Several cities (Anchorage, Sitka) have successfully used a wetland plan, prepared cooperatively by state, federal and local agencies and developers, to gain a general permit (GP) for urban developments.

The Alaska District has progressed towards broader jurisdictional authority over tundra and spruce forest wetlands and more timely processing through cooperation with state agencies, publicity of the program and more efficient organization of the regulatory functions branch. The district has issued general permits for several types of oil and gas development in the Arctic and is currently drafting a GP to cover those activities permitted by a DNR plan of operation. The exact details of this GP are still being negotiated. The district has participated in planning in a number of regions and facilitated use of general permits in Anchorage and Sitka.

The recent interim regulations (July 1982) and nationwide permits could have deleterious effects in certain regions due to the cumulative implications of many fills. The Alaska District is working with the state to devise regional conditions to alleviate adverse environmental effects.

CONCLUSION

Statewide, the 404 program has the broadest jurisdiction and regulatory authority over activities in Alaska wetlands. Several state programs duplicate 404 in regulating particular areas of the state or activities. Alaska has a vast area of wetlands comprising up to 58% of the state. Several wildlife resources (salmon, waterfowl, and caribou) are associated with wetlands and wet tundra, which are of economic or subsistence value. Furthermore, particular subsurface resources (oil, gas and minerals), underlie wetlands. In coastal urban areas, wetlands often represent the only flat lands and building sites for new construction. The level of development and consequent loss of wetlands which may be reached prior to affecting wildlife populations, and ultimately, the human harvesters of these animals, is largely unknown.

INTRODUCTION

INTRODUCTION

The Clean Water Act (Federal Water Pollution Control Act, Amended 1972 and 1977) established a permit program that regulates the discharge of dredged and fill material into waters of the United States (33 U.S.C. 1344). The program is administered by the U.S. Army Corps of Engineers, represented by the Alaska district. The program is subject to EPA guidelines and the oversight role of Region X.

This case study approaches wetland regulation and the Section 404 program from a broad perspective. Through examination of the statewide extent of wetlands, historic losses, industries dependent upon wetlands and future development plans, a yard stick for wetlands development pressures and their effects is disclosed. The following study assesses the problems and benefits of applying the 404 program to Alaska wetlands, and the set of state and federal laws auxiliary to the 404 program which are instrumental in some aspect of wetland or environmental review. In this assessment we make use of the Corps regulatory definition of wetlands and describe the application of this definition to wetland areas within the state. Table 1-1 lists various wetland definitions advanced by different federal agencies.

APPROACH

Concerning characteristics and regulation in Alaska, a great deal of information exists on some subjects but adequate data are lacking in other areas. Consequently, from published literature, governmental reports and files, and interviews with informed persons, we have constructed an image of wetlands and their use and regulation in Alaska. During our field visit and by telephone we interviewed over 35 people from government agencies, industry and conservation groups. The resultant information illustrates the predominant trends and issues and describes the overall effects of the 404 program on wetlands. We have selected an array of Corps permit case histories from different regions to describe the operation of the 404 program. To the extent possible, we have collected and summarized information on wetland resources, distribution, historic losses, and values as wildlife and fishery habitat. We have provided a comprehensive overview, excluding unsubstantiated facts and unwarranted details.

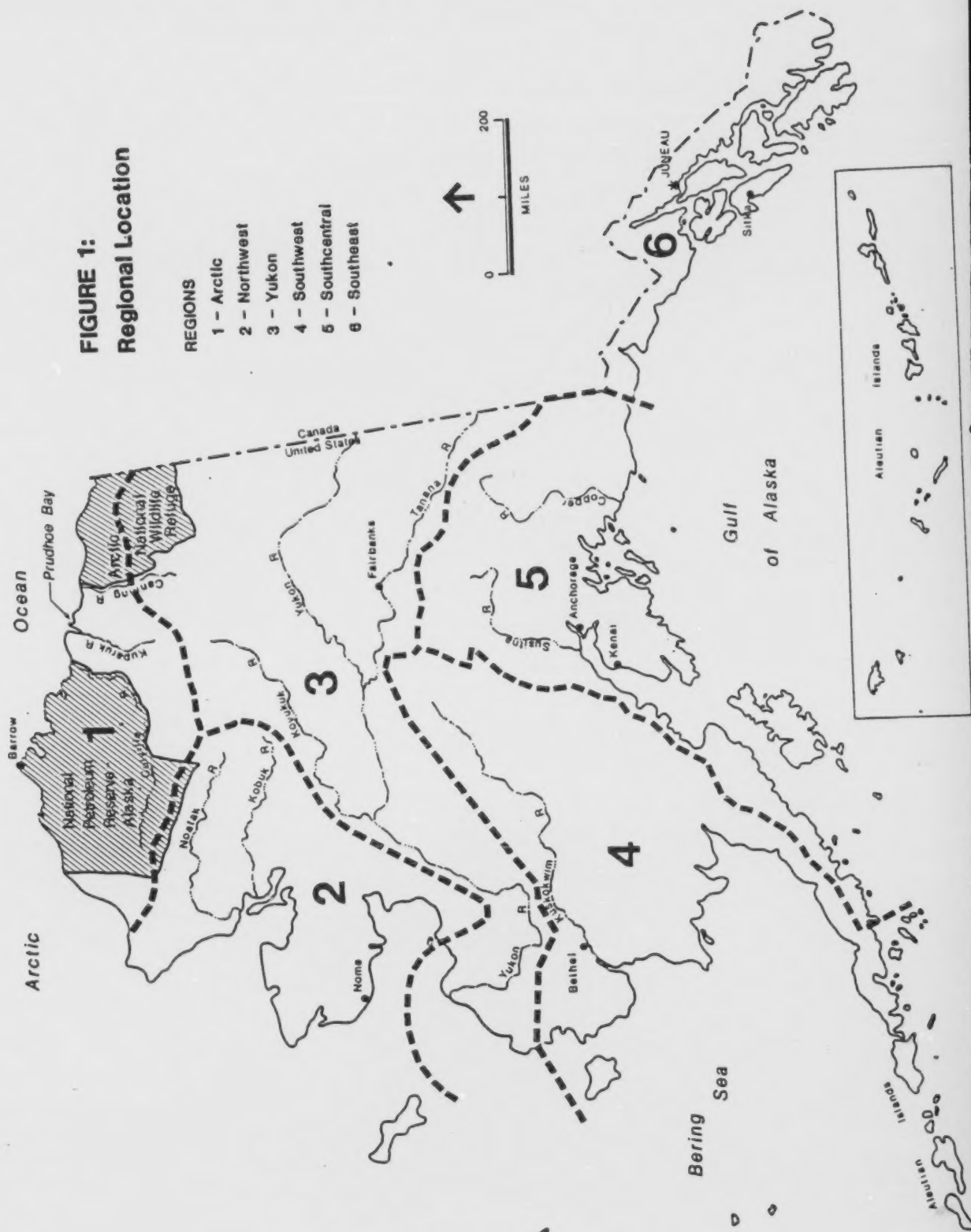


TABLE 1-1

WETLAND DEFINITIONS

President Carter's E.O. 11990 (May 24, 1977) defines wetlands as follows: "The term wetlands means those areas that are inundated by surface or groundwater with a frequency sufficient to support and under normal circumstances do or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mudflats, and natural ponds." (emphasis added)

The joint Corps-EPA 404(b) permit regulations (July 19, 1977) define wetlands as follows: "The term wetlands means those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas." (emphasis added)

The Fish and Wildlife Service's wetland classification system (December, 1979) defines wetlands as follows: "Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification wetlands must have one or more of the following attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year."

Traditional navigability (also called "Section 10 jurisdiction"): Navigable waters subject to federal authority, defined over a period of 80 years as those which are used or susceptible of being used in their ordinary condition as highways for commerce... A waterway once navigable in interstate retains its identification as navigable regardless of modifications... or if reasonable improvements can make a water way suitable for navigation in interstate commerce...; subject to the ebb and flow of the tide, to the mean high tide line in tidal waters (formerly MHHW on Pacific Coast) and ordinary high water mark in nontidal rivers and lakes. Outside the high water mark, jurisdiction is extended only if projects would affect the course, location, or capacity of navigable waterway.

Waters of the United States (also called "Section 404 jurisdiction") defined in the Corps' 1980 interim regulations, waters of the U.S. include:

- (1) All waters, including their adjacent wetlands, that are part of a surface tributary system to and including navigable waters of the United States (man-made, nontidal drainage and irrigation ditches excavated on dry land are not considered waters of the U.S. under this definition);
- (2) Interstate waters and their tributaries, including adjacent wetlands; and
- (3) All other waters of the United States not identified in paragraphs (1) - (2) above, such as isolated wetlands and lakes, intermittent streams, prairie potholes, and other waters that are not part of a tributary system to interstate waters or to navigable waters of the United States, if in the opinion of the Division Engineer the degradation or destruction of such waters could affect interstate commerce.

This study provides a broad informational overview on the use of wetlands in Alaska. It is not intended to assess policy options or to resolve such issues as:

- o the Congressional intent associated with regulating "all waters of the U.S.";
- o the definition of wetlands and the appropriateness of the Corps' present jurisdiction over wetlands in Alaska;
- o the necessity for both state and federal programs for controlling the use of wetlands;
- o the effectiveness of the 404 program;
- o the environmental impact of past and future wetland losses;
- o the extent to which ongoing development is being performed in an environmentally sensitive manner;
- o the ability of the State of Alaska to assume responsibility for administering the 404 program.

We have separated the state into six regions following divisions accepted by the Joint Federal-State Land Use Planning Commission. The regions, beginning in the north, are: the Arctic, the Northwest, the Yukon, the Southwest, Southcentral and the Southeast. These biogeographical divisions are illustrated in Figure 1 and will serve as reference areas for location of particular sites, description of wetland distributions, and examination of development activities and regulatory case histories.

**WETLAND USE :
PAST & PRESENT**

WETLAND USE: PAST AND PRESENT

ALASKA SUMMARY

The wetlands of Alaska are diverse in type, distribution, and ecological function. Wetlands occupy the swampy coastal lowlands and lake country, upper margins of estuarine inlets and fiords, outer reaches of broad river floodplains, borders of tributary streams, and the vast plains of wet tundra. Unlike many parts of the nation, Alaska's wetlands frequently lack easily definable boundaries and vegetative indicators. The harsh climate of most regions of Alaska limit plant species distribution; hydric soils are a secondary feature in most freshwater areas. Consequently, a single plant species will grow in wetland conditions and nonwetland conditions. This situation especially holds true for the moist tundra and various black spruce vegetative types. Coastal marshes are more easily recognized by their location and typical plant species. Appendix A lists vegetation communities which may contain wetlands and their representative plant species.

These biotic conditions make the wetlands of Alaska difficult to define or describe. The Alaska Corps District, in the absence of definitive wetland maps of the state, has formulated an estimate of the total wetland acreage by region. These estimates are based on two calculations. The first calculation involves estimation, based on field determinations, of the percent of each vegetation community which is potentially wetland. Table 2-1 lists these figures for the major plant cover types. Then, based upon these estimates, the total potential wetland acreage is extrapolated for each region from acreage figures of cover types for each area. Table 2-2 summarizes these estimates. As the table illustrates, nearly 58% of the State of Alaska could potentially be delineated wetlands according to the Corps definitions. These estimates do not include tidelands and coastal marsh, the acreage of which is much lower than other vegetation types. Nearly half (43%) of these potential wetlands are tundra of the wet, moist or alpine community type. The majority of the state's wetlands are in the Yukon, southwest, and northwest regions. However, extensive wetlands occur in the southcentral, southeast, and Arctic regions as well. Figure 2 represents generalized boundaries for the larger areas of wetlands in Alaska.

TABLE 2-1

ESTIMATED WETLANDS BY VEGETATION COMMUNITY

<u>Vegetation Community</u>	<u>Percent Potentially Wetland</u>
Wet Tundra	100
Moist Tundra	90-100
Alpine Tundra	15
High Brush	60
Upland Spruce/Hardwood Forest	30
Lowland Spruce/Hardwood Forest	95-100
Bottomland Spruce/Hardwood Forest	60
Low Brush-Bog Muskeg	30
Coastal Marsh	100
Freshwater Lakes, streams and ponds	100

SOURCE: Alaska District, U.S. Corps of Engineers (1982)

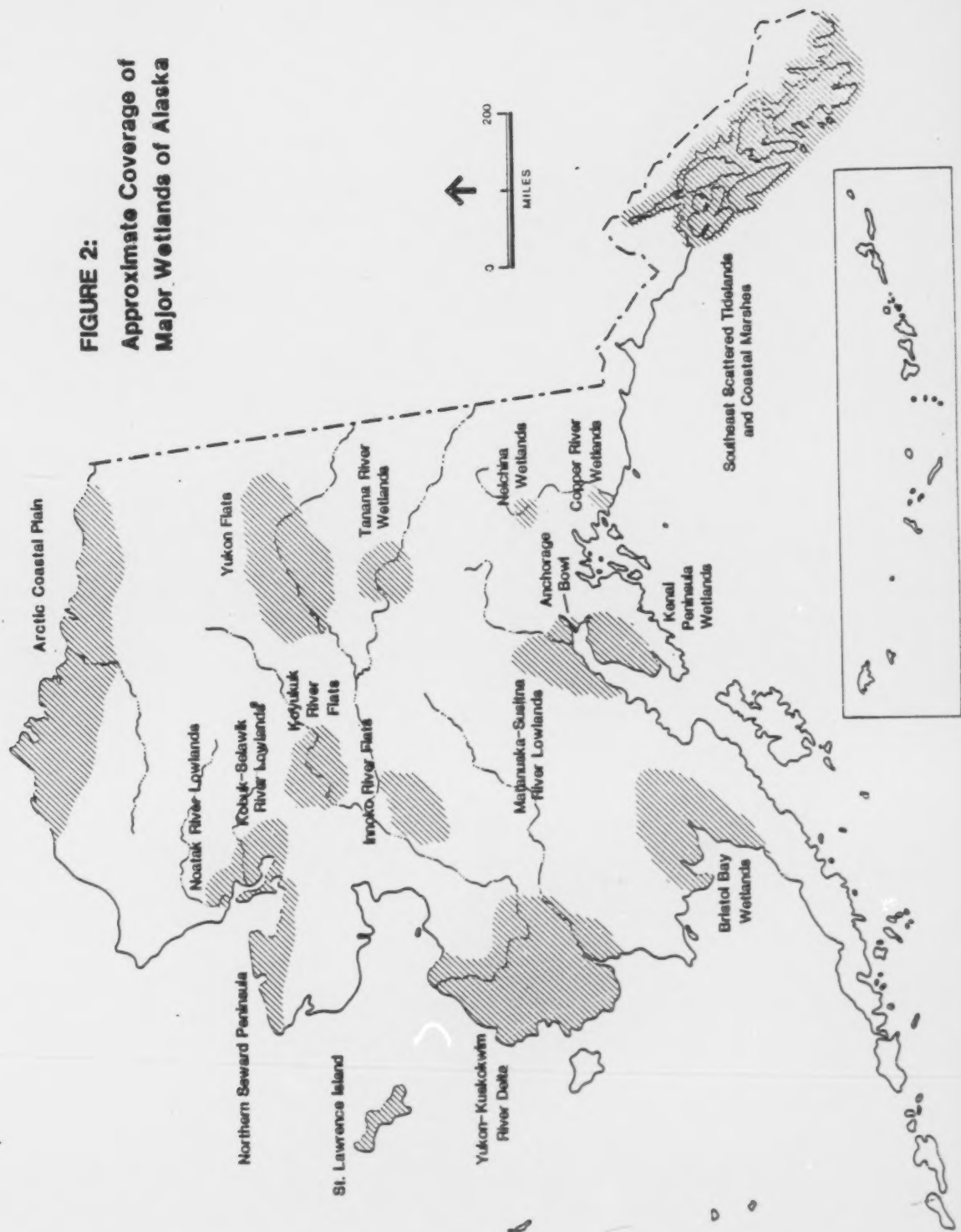
TABLE 2-2
POTENTIAL AREA OF WETLANDS IN ALASKA

by Region

REGION	TOTAL LAND AREA OF REGION (MILLION ACRES)	PERCENT OF TOTAL STATE AREA	TOTAL AREA POTENTIALLY WETLANDS (MILLION ACRES)	TUNDRA AREA POTENTIALLY WETLANDS (MILLION ACRES)	PERCENT OF EACH REGION POTENTIALLY COVERED BY WETLANDS	PERCENT OF TOTAL POTENTIAL WETLAND AREAS OF STATE WITHIN REGION	PERCENT OF THE TOTAL AREA OF STATE POTENTIALLY WETLANDS
Arctic	48.9	13	37.2	33.4	76.2	16.7	9.6
Northwest	78.1	20	52.4	18.5	67.2	23.5	13.5
Southwest	67.2	17	40.3	24.7	60.0	18.1	10.4
Yukon	123.2	32	60.3	13.3	49.0	27.0	15.6
Southcentral	45.4	12	16.4	6.3	36.1	7.4	4.2
Southeastern	24.4	6	16.4	1.4	67.2	7.4	4.2
Total for State	387.2		223.0	97.6			57.5%

Source: Alaska District, U.S. Army Corps of Engineers 1982

**FIGURE 2:
Approximate Coverage of
Major Wetlands of Alaska**



Wetland losses in Alaska are limited to a few locales, and these losses are small by comparison to the acreage of wetlands remaining. These extensive wetland systems account for the abundance of certain wildlife species of both economic and subsistence value to state residents. Moose and caribou as well as several commercial species of salmon and other fish utilize freshwater wetlands or tundra throughout the state during some portion of their life cycles. Waterfowl returning from wintering grounds in the United States and Canada congregate over several large wetlands: the Yukon-Kuskokwin Delta, Kobuk-Selawik River Lowlands, Arctic Plain, Yukon Flats, and Copper River Delta to nest and feed. An estimated 13 million waterfowl nest in Alaska wetlands. (King and Lensink, 1971) Shorebirds also migrate to the vast reaches of tundra to nest and feed. Therefore, these wetland systems are of prime importance to the sport and commercial fishery, hunting, and subsistence lifestyle of Alaska. Table 2-3 summarizes wildlife uses of the major wetland areas of each region.

Development in wetlands are of several types throughout the various regions of the state. Oil and gas exploration and development has proceeded in the Arctic region for many years. The Prudhoe Bay oil field taps one of the largest oil reservoirs in the world. Exploration is expected to continue both on and offshore in the Arctic region as well as in Bristol Bay, the Yukon-Kuskokwin delta, Bethel area, and the Yukon Flats. Mineral extraction and accompanying road development is planned on a large scale in many wetland areas of the state. Major proposed mines include: Red Dog Mine, north of Kotzebue; Beluga coal fields, west of Anchorage; Bering River coal field, in Chugach National Forest; and the U.S. Borax molybdenum mine in the southeast. Small-scale placer mining is widespread in the Yukon and southcentral regions. Urban growth in the cities of southcentral and southeastern Alaska is confined to the small wedge of flat coastal land abutting mountains and ocean. This land is very often wetlands. Proposed hydroelectric projects in the two southern regions of the state would inundate or displace some wetland areas. Construction of log transfer sites in the southeast and small boat harbors in various regions represent a relatively minor impact to wetlands.

The scope and degree of development and consequent loss of wetlands which can be sustained in various regions without adversely affecting wildlife populations is largely unknown. The following regional discussions outline, in general terms, the wetland resources of the state, noting the major areas in each region and their ecological importance. To the extent known, we have included accounts of significant losses of wetlands. Statewide, current and proposed projects, which may impact wetland areas, either singly or cumulatively, are collected into a section according to the type of development proposed.

TABLE 2-3
OVERVIEW OF WILDLIFE USE OF ALASKA WETLAND AREAS*

Region	Wetland Type	Wildlife Species	Primary Use/Population	Specific Areas of Importance
ARCTIC	wet tundra - thaw lakes, tundra basins with emergent <i>Arctophila fulva</i> , partially drained basins	numerous species of migratory waterfowl and shorebirds	nesting and breeding habitat, 1/2 million waterfowl	coastal plain west of Colville Delta in NPRA
		oldsquaw, greater scaup, pin- tails, green-winged teal, mallards, Canadian geese and others	nesting and breeding habitat staging and feeding	central Arctic including Prud- hoe Bay area Hulahula River area
		snow geese	nesting and breeding - only area in Alaska	mouth of Sagavanirktok River
		plintails, green-winged teal, old squaw and others	nesting and breeding staging area	eastern Arctic - Arctic NWR
		black brandt, white-fronted geese, lesser Canadian geese, snowgeese and others	molting, over 100,000 birds	Teskeput Lake vicinity - NPRA
		caribou	calving grounds	Arctic coastal plain
	coastal estuarine lagoons and brackish marshes	shorebirds and waterfowl	migratory route - used by 2/3 of all Canadian Arctic birds, 1 million king eider use yearly	Arctic coast
		caribou	feeding and resting area - first to thaw in region	Arctic plain and foothills
	moist tussock tundra, alpine tundra	moose, bear, wolves, others	range	river floodplains
	high brush vegetation	waterfowl, shorebirds	range	
NORTHWEST	bottomland spruce/hard- wood forest and lakes		breeding and nesting habitat - 234,000 breeding duck population	Kobuk River Valley Noatak, Koyuk and Selawik Rivers
	coastal lagoons and marshes	migratory waterfowl and shorebirds	resting and feeding area - only sheltered estuarine habitat between Arctic coast and Yukon delta	Seward Peninsula

*This table is not intended to be a comprehensive inventory of wildlife use of Alaska wetlands but to give a general summary of the types of species and their activities in various wetlands of the state.

TABLE 2-3
Page 2

Region	Wetland Type	Wildlife Species	Primary Use/Population	Specific Areas of Importance
NORTHWEST (Cont.)	wet tundra - thaw lakes and tundra basins	waterfowl, loons, cranes, shorebirds	breeding and nesting habitat - 230,000 breeding duck popula- tion	northern Seward Peninsula, St. Lawrence Island
	wet, moist and alpine tundra	caribou	migratory range for western Arctic herd	eastern portion of region
		reindeer	domestic range	Seward Peninsula
	coastal brackish marsh, spruce forest types, low brush/bog muskeg, wet tundra	waterfowl, shorebirds, gulls, cranes, loons, grebes, other species	breeding and nesting habitat - 2.3 million ducks, 40,000+ whistling swans, 50% of all black brant, 80-90% of all cackling and emperor geese and all white-fronted geese on Pacific Flyway	Yukon-Kuskokwin Delta
YUKON	spruce forest types, low brush/bog muskeg	waterfowl, gulls, terns, shore- birds, grebes, other species	breeding and nesting habitat - 1 million ducks 1/2 million geese 2.1 million waterfowl, 10,000 sandhill cranes, 15,000 Arctic loons	Yukon-Innoko - Koyukuk River Flats Yukon Flats Yukon-Tanana-Porcupine Flats, Minto Flats, Tetlin area floodplain of Yukon River and tributaries
	high brush, low brush/bog muskeg	furbearers, bear, moose	range	
	river channels	salmon and other fish species	spawning and rearing habitat	
	wet, moist, and alpine tundra	caribou	range - eight herds	separate herds occupy distinct subareas within region, two herds migrate between Arctic and Yukon regions
SOUTHWEST	wet, moist and alpine tundra	caribou	range - three herds	upper Kuskokwin River watershed
	spruce forest types, lakes	waterfowl, shorebirds, trumpeter swan	breeding and nesting habitat	Nunivak Island, Yukon-Kuskokwin Delta (see Yukon region above)
	high brush, low brush/bog muskeg	moose, furbearers, bear	range	river floodplains

TABLE 2-3
Page 3

Region	Wetland Type	Wildlife Species	Primary Use/Population	Specific Areas of Importance
SOUTHWEST (Cont.)	coastal marsh, estuarine lagoons	waterfowl	staging and feeding area for northern Arctic nesting ground	Bristol Bay and watershed with numerous lakes and tributary streams
	eelgrass beds	black brant, emperor geese	large proportion of Pacific Flyway population rests in lagoons	
	river channels, freshwater spruce forest types	salmon - several species	spawning and rearing habitat	
	lowland spruce, bottomland spruce, low brush/bog muskeg	waterfowl and shorebirds trumpeter swan	resting and feeding habitat nesting habitat	Anchorage bowl, upper Matanuska River, southern Alaska Peninsula, Kenai Peninsula, upper Copper River, Nelchina wetlands
SOUTHCENTRAL			70,000 waterfowl resting habitat	Susitna River Valley
	high brush, low brush/bog muskeg	moose, bear, furbearers	range	Matanuska-Susitna River Valleys, Kenai Peninsula, Copper River Valley, eastern Cooks Inlet
	tidal flats, river channels, coastal brackish marsh	waterfowl and shorebirds	resting and feeding habitat	upper Knik Arm and Cook Inlet, Matanuska River Flats, Kachemak Bay, marshes in Prince William Sound
			first wetland in Cook Inlet to become ice free 250,000 shorebirds/square mile, 20 million birds over entire delta	Kenai Flats Copper River Delta
		dusky Canadian geese	principal resting ground for entire population {35,000	
		trumpeter swan	nesting habitat	
		salmon - several species	rearing and spawning habitat	upper Cook Inlet, Kachemak Bay, Susitna, Matanuska, Knik, Kenai, Copper Rivers
	wet, moist and alpine tundra	caribou	range - two herds	upper Susitna and Matanuska Rivers, Nelchina and Copper River watersheds

TABLE 2-3
Page 4

Region	Wetland Type	Wildlife Species	Primary Use/Population	Specific Areas of Importance
SOUTHEAST	tidal flats, coastal brackish marsh	shorebirds and waterfowl	resting and feeding habitat	Yakutat Flats, Stikine River, Meidenhall Flats, small marshes at the heads of bays and river mouths

SOURCES:

University of Alaska, Arctic Environmental and Information Data Center, L. L. Selkegg ed. 1974-76 Alaska Regional Profiles Vols 1-6.
Brown, J., editor 1975. Ecological Investigations of the Tundra Biome in the Prudhoe Bay Region, Alaska. Biological Papers of the University
of Alaska, Special Report No. 2. Bergmann, R. D. et al. 1977. Waterbirds and Their Wetland Resources in Relation to Oil Development at
Storkersen Point, Alaska, U.S. Fish and Wildlife Service Resource Publication 129. Bucaria, G.P. et al. 1979. Copper River Delta Area Wildlife
Resource Review, Chugach National Forest, U. S. Forest Service. Derksen, D.W. et al. 1981. Use of Wetland Habitats by Birds in the National
Petroleum Reserve, Alaska, U. S. Fish and Wildlife Service, Special Resource Publication 141. King, James G et al. 1971. An Evaluation of
Alaskan Habitat for Migratory Birds, U. S. Bureau of Sport Fisheries and Wildlife. Hogan, M.E. et al. 1980. Birds of Coastal Habitats in Port
Valdez Arm, Alaska U. S. Fish and Wildlife Service. Ritchie, Robert et al. 1981. Knik Arm Wetlands Study, U. S. Fish and Wildlife Service.
U. S. Army Corps of Engineers, 1978. Wetlands of Potter Marsh. U. S. Army Corps of Engineers, 1978. Kenai River Review.

ARCTIC REGION

Wetland Distribution

The Arctic Region extends from Pt. Hope on the Chukchi Sea in a nearly straight line east to the Canadian border encompassing approximately 82,000 square miles between the Brooks Range and the shore of the Beaufort and Chukchi Seas. (University of Alaska, 1975) The region contains three physiographic provinces: the Brooks Range, the Arctic Foothills, and the Arctic Coastal Plain. Wet tundra is concentrated on the Arctic Coastal Plain with drier tussock or moist tundra dominating foothill regions and alpine tundra covering certain portions of the higher mountains. Rivers are numerous and larger drainages have wide braided-channel floodplains with riparian vegetation lining higher river terraces and oxbow lakes and wet meadows occupying non-active floodplain areas. The Colville River is the largest river in the region draining nearly 24,000 square miles and terminating in a 200 square mile delta at the Beaufort Sea. Other major rivers include the Kuparuk, Sagavanirktok and Canning with smaller drainages, the Kukpowruk, Kokulik, Utukok, Kuk, Meade and Ikpiuk Rivers.

The Arctic Coastal Plain of nearly 25,000 square miles, a vast frozen flatness during the long winter, becomes a varied maze of thaw lakes, tundra, frost and ice mounds, pingos, and river channels after summer break-up. Low annual precipitation, lack of topographic relief, yearly freeze and thaw cycles, occurrence of a continuous permafrost* layer, and poor soil drainage typify conditions on the plain for the tundra vegetation occurring there. Several types of tundra vegetation of potential wetland character are found. (See Table 2-4)

Along the coast, a limited area of protected estuarine lagoons and marshes dot the coastline. The marshes, which receive seawater primarily during storm surges, are dominated by brackish marsh sedges and grasses. A complex of thaw lakes and wet tundra covers most areas near to the shoreline extending inland for miles and gradually grading into drier, tussock tundra covering the southern portions of the plain and foothills.

Permafrost, soil, tundra and water interact in an everchanging landscape of thawing, ground-settling, freezing, and refreezing forming the geometric formations characteristic of the tundra

*Permafrost is any earth material, such as soil or bedrock, that has remained below 32 degrees F (0 degrees C) at least from one winter through the next. This is the minimum duration of permafrost; much has been in existence for tens of thousands of years.

TABLE 2-4

ARCTIC REGION VEGETATION COMMUNITIES

	<u>Acres (million)</u>	<u>Percent of State Total</u>	<u>Percent of Vegetation Potentially Wetland</u>
Upland Spruce Hardwood Forest	.3	1	30
High Brush	6.3	36	60
Moist Tundra	26.5	40	90-100 bottom land only (not foothills)
Wet Tundra	8.5	26	100
Alpine Tundra Barren Ground	7.3	8	15
Coastal Marsh	unknown	-	100

SOURCE: University of Alaska Arctic Environmental Information and Data Center. 1975. Alaska Regional Profiles: Arctic Region.

wetlands. Tundra covers ice polygons incised in the ground surface. Thaw lakes cover more than half the land surface of the plain (University of Alaska, 1975; Walker et al, 1980) and are formed in response to ground disruption of the tundra. Removal of the insulating layer of vegetation results in thawing of underlying ice layers and eventual formation of a thaw lake. (Walker et al, 1980) Such lakes are oriented along a northwest-southeast axis reflective of the prevailing wind and its effect on lakeshore erosion. Ultimately, many lakes drain as a result of hydrostatic pressure against a small divide, and leave a marshy basin which develops a highly productive and characteristic wetland flora. These partially drained basins may then reform ice wedges and permafrost and eventually a cover of tundra polygons or other features (e.g., pingo, a conical hummock formed through upward movement of ice).

This dynamic process of thaw lake and ice polygon formation creates a varied surface upon which both wet and moist tundra may occur. Differences in microrelief are reflected in varying types of plant cover. Drained and partially drained lakes, the low centers of polygons, lake edges, and river floodplains are particularly wet areas. The wet tundra vegetation dominated by sedges (*Carex aquatilis*, *Carex* spp.), cotton grass (*Eriophorum angustifolium*), *Arctophila fulva*, and mosses overlie a continuous permafrost boundary, the surface of which (upper 12 to 16 inches) seasonally thaws and serves as a hydrologically active layer. This layer of vegetation and its peaty soil essentially floats upon the active layer insulating the ice beneath from melting. Slightly higher ground areas, such as the elevated ridges of polygon rims, pingos, and river terraces, are less wet and covered in other moist tundra plant species, including *Carex rupestris*, *Dryas intergrifolia*, lichens, and others. (Brown et al, 1975; Walker et al, 1980) Moist tundra of varying plant composition stretches from a scattered distribution on the Arctic plain to a nearly continuous cover in the foothills. This area of moist tundra may have discrete patches of wetland interspersed among the drier tussocks of cotton grass.

River floodplains are lined by columns of high brush vegetation of willow, alder, grasses and sedges in summer months. During winter the tundra thaw lakes, and river channels are frozen and mobile water exists only in the deeper pools and lake bottoms.

Historic Development

Filling and development of wet and moist tundra has proceeded in two of the three areas of the Arctic region in response to oil and gas exploration and extraction. Most known onshore oil and gas resources are overlain by wet and moist tundra. Two areas, the Prudhoe Bay-Kaparuk Oil Field and the National Petroleum Reserve Alaska (NPPRA) have had the greatest amount of development.

In 1923, President Harding established the 37,000-square mile NPRA in the western portion of the Arctic Region adjoining the town of Barrow. The U.S. Navy carried out geologic investigations and exploratory drilling between 1923 and 1953. Private oil companies completed seismic studies and exploration activities in the Prudhoe Bay area in the 1950s and 1960s. By 1955, 36 test wells had been drilled in the NPRA and approximately 23 since that time. No major oil and gas extraction development has yet occurred on the NPRA. Many of these early activities largely were done in the absence of an understanding of arctic engineering and resulted in damage to the tundra. Heavy equipment use and early road building techniques plowed and crushed the tundra. Once the vegetation was removed or killed, the exposed permafrost thawed creating water-filled ditches and beginning a process of thermal erosion and progressive deepening of the track ditches. (Hok, 1969; Reynolds, 1978; Hickok, pers. comm.) The Hickel Highway affords one example of these early projects. In addition, the construction of road berms from packed snow or gravel, if done incorrectly, may create a barrier to summer water flows. The result is an impoundment of water and subsequent melting of permafrost along one side of the road. The total acreage of wet tundra removed and covered during this period is unknown.

A greater understanding of permafrost conditions has fostered great advancements in arctic engineering. Gravel and other materials are now used to build up drilling pads and road berms and provide an insulated layer atop the permafrost.

In 1968, oil was discovered in Prudhoe Bay, the culmination of over 20 years of exploration. This field is the largest oil reserve yet discovered on the North American continent. The State of Alaska leased out the subsurface reserve and estimated 9.6 billion barrels of recoverable oil and over 26 trillion cubic feet of salable gas. (Walker et al, 1980) The Prudhoe Bay field now covers 400 square miles with most facilities confined to a 200-square mile area. The field is operated by two oil companies: Sohio and Arco. The Kuparuk oil field, 40 miles west of Prudhoe Bay, despite its discovery in 1969, has only recently (1980) developed. Production is lower than the Prudhoe Bay field; oil is transported via pipeline to pumping and collecting stations.

The Trans Alaska pipeline (TAPS), completed in May, 1977, transports Prudhoe Bay oil to port and storage facilities in Valdez. The pipeline and adjoining haul road in their 800-mile length cut through wet tundra as they ascend from the Arctic Plain into the Brooks Range. To avoid permafrost deterioration, the pipeline is elevated above ground level and its support members refrigerated.

Impacts of Oil and Gas Development

The Corps, in a 1980 estimate of development impacts in the Arctic Region, concluded: The North Slope Region contains 48.9 million acres. The total documented area of disturbance is approximately .015% of the total acreage. The disturbance is concentrated on approximately 160,000 acres within the Prudhoe Bay oilfield. According to the Corps, this represents approximately 4.5% of the total field being filled for oil related developments. Oil company estimates place this figure at 2.4% of the participating area and 1.2% of the total unit acreage. (Arco, 1983) The exact acreage of filled wetlands remains unclear.

In assessing impacts, one cannot consider only the primary impacts such as areas actually filled: there are secondary and tertiary impacts that are present as well. Besides the direct impact of placing fill which smothers organisms and changes the area to a nonwetland or fast-land, other primary impacts to areas adjacent to the fills placed include the creation of a thaw-bulb in the permafrost under the fills, alteration of hydrology which include both the impounding of water thereby creating new wetlands and the dewatering of other sites, and compaction of soils. Secondary impacts include: Waste discharges as a result of surface runoff from operation areas; disruption of migration routes for birds and mammals; disturbance to adjacent habitats; and the alteration of lifestyle and habitats of the resident wildlife population.

Dust problems due to traffic and the resultant mud spray due to dust control methods have also resulted in an expansion of the area of impacts. Disposal of snow containing gravel and other contaminants into stockpiles and the discharge from snowplows and other removal equipment have also contributed to alteration of adjacent areas not directly filled. (Nunn, 1982)

The translation of these developments into impacts on waterfowl, shorebird and caribou populations is not a clear-cut issue. The Prudhoe Bay development and the Trans Alaska pipeline have displaced some wetland habitat and wildlife using these habitats. The degree of this disturbance and its significance is estimated differently by oil company biologists, fish and game biologists, and consultant and university biologists.

An impact related to oil development has affected river floodplains which were mined for gravel to construct roads and drilling pads. The Sagavanirktok River, quarried extensively for gravel, has experienced morphological changes in stream channel patterns and pool occurrence. The result has been a reduction in fish habitat particularly for overwintering use. (Booth, Hickok, pers. comm.) These types of findings

and continual need for gravel from the rivers has given rise to the concept of consolidation of gravel roads and pads in oil development. (Booth, pers. comm.) Many operators on the North Slope are now required by the Alaska Department of Fish and Game to mine gravel from the inactive portions of a river floodplain, or that area separated from the active flood channel by a vegetation corridor or bank. (Trasky, pers. comm.)

NORTHWEST REGION

Wetland Distribution

The Northwest region covers approximately 67,000 square miles stretching southward to the Yukon River and northward to the Brooks Range and Cape Lisburne on the Chukchi Sea. It encompasses the Seward Peninsula, Kotzebue Sound, and Norton Sound areas. The major rivers are the Noatak, Kobuk, Kuzitrin, and Selawik.

Many of the rivers of this region are sluggish in their lower reaches, coursing through wide floodplains with numerous lakes, sloughs, and oxbows. Freshwater lakes and wetlands dot the lower Kobuk, Noatak, and Selawik Rivers grading into delta areas near Kotzebue on Hotham Inlet. Norton Sound and the Seward Peninsula have a highly dissected coastline characterized by low barrier islands and lagoons with coastal marshes.

Moist tundra is the predominant vegetation type in this region and covers much of the foothill area. Wet tundra and thaw lakes cover large acreages of lowland along the northern Seward Peninsula, Selawik basin, Noatak River, Norton Bay coast, and the Kobuk River Delta. Smaller patches are distributed throughout the region. Table 2-5 summarizes the major vegetation types of the region, their acreages, and location. The Northwest region contains a great deal of wetlands, potentially 67% of the region, and 23.5% of the state total.

Major waterfowl habitat includes the Noatak, Selawik, and Kobuk River lowland lakes and areas near Kotzebue Sound. A breeding population of 234,000 ducks occurs in this area with averages of 44 ducks per square mile. The north side of the Seward Peninsula averages 230,000 ducks. Swans, Canada and white-fronted geese, loons, cranes and shorebirds frequent freshwater wetlands in this area. Coastal lagoons and deltas on the Seward Peninsula are habitat for migratory bird populations as they represent the only large expanse of sheltered estuary between the Arctic coast and the Yukon Delta along the Pacific Flyway. The Western Arctic caribou herd migrates into the eastern portion of this region. Domestic reindeer are ranged over parts of the Seward Peninsula and Kotzebue areas. These stock also utilize wetland habitats. (University of Alaska, 1976a)

Three national wildlife refuges, Selawik, Koyukuk, and Kanuti as well as the Bering Land Bridge National Preserve encompass large acreages of wetlands in this region.

Historic Development

This region lacks large developments and apparently has sustained small losses of wetlands. Exploratory seismic investigations and oil and gas drilling has left some scars on the tundra due to thermal erosion of the permafrost boundary which is nearly continuous within this region. (Racine, 1977). Gold mining along the Seward Peninsula and marine terraces near Nome resulted in mine tailing disposal into wetland areas. (Hickok, pers. comm.) The Seward Peninsula has produced nearly 30% of the placer gold mined in Alaska. Other gold, tin, copper, and mineral mining operations have been and continue to be widespread in the region but their impact on wetlands is undocumented. Examples are the large copper mines at Bornite and Arctic Camp, lode gold mines on the Solomon River, and placer gold in the Council District near Ophir Creek. (University of Alaska, 1976b) The main city of the region is Nome which has three highways emanating from it. Most settlements were constructed near rivers or bays and may have filled wetlands.

YUKON REGION

Wetland Distribution

The Yukon consists of 35% of the state (130 million acres) and stretches from the Canadian border to the Bering Strait encompassing the watershed of the Yukon River and its tributaries. This immense area contains two of the most significant wetland areas: the Yukon-Kuskokwin Delta and the Yukon Flats as well as numerous smaller floodplain and bog muskeg wetlands. Four national wildlife refuges include the major wetland areas of this region: Yukon Flats, Yukon Delta, Nowitha, and Innoko National Wildlife Refuges. The numerous rivers of the region drain into a vast central lowlands area. The level topography and broad extent of these central flats makes for an abundance of backwaters, oxbow lakes, and wooded floodplain wetlands and low brush-muskeg. (University of Alaska, 1966)

Table 2-6 describes the major vegetation types, their acreage and location. This region has the majority of the state's muskeg bogs, bottomland spruce, upland spruce, and lowland spruce forests. Tundra, while covering significant areas, is not the primary vegetative cover. Approximately 49% of the region is potentially wetland, representing 15.6% of the state total.

TABLE 2-5

NORTHWEST REGION VEGETATION COMMUNITIES

	<u>Acres (millions)</u>	<u>Percent of State Total</u>	<u>Percent Potentially Wetland</u>	<u>Primary Location Within Region</u>
Bottomland Spruce/Hardwood Forest	1.4	8	60	Kobuk River Valley, lower Noatak, Kovuk Rivers, most of Sela- wik River
Upland Spruce/ Hardwood Forest	6.6	10	30	Baird and Schwatka Mountains, Lockwood Hills, Nulato Hills
Lowland Spruce/ Hardwood Forest	1.0	3	95 - 100	Lowlands of Kobuk River
High Brush	4.0	23	60	Floodplain of Noatak River drainage, Kuglvaik Mountain Foothills
Low brush/ Bog Muskeg	.1	1	30	Unalakleet River area north of Golovin on Seward Peninsula
Moist Tundra	12.3	19	90 - 100	Foothill Areas through- out region
Wet Tundra	7.0	22	100	Northern Coast of Seward Peninsula, Selawik Basin, Noatak River, Norton Bay Coast, Kobuk River Delta
Alpine Tundra and Barren Ground	9.7	11	15	High exposed hillsides throughout region
Coastal Marsh	unknown		100	Coastal Lagoon and Delta areas
TOTAL:	42.1		67.2	

SOURCE: University of Alaska, Arctic Environmental Information and Data
Center. 1975. Alaska Regional Profiles - Northwest Region.

TABLE 2-6

YUKON REGION VEGETATION COMMUNITIES

	Acres (million)	Percent of State Total	Percent Potentially Wetland	Primary Location Within Region
Bottomland Spruce/Hardwood Forest	12	67	60	Backwater areas, broad level flood- plains, low river terraces of Yukon, Koyukuk and Tanana Rivers
Upland Spruce/ Hardwood Forest	43.4	68	30	Yukon Flats area, most common vegetation type found throughout the region excepting in the Yukon Delta.
Lowland Spruce/ Hardwood Forest	23.2	66	95-100	Throughout the region, most common on peat deposits and outwash plains and lowlands
High Brush	.7	4	60	Floodplains, borders of timber line
Low Brush-Bog Muskeg	9.2	88	30	In interior and upper river areas in wet basins, old river terraces and outwash plains, sloughs, and ponds; coastal basins and ponds
Moist Tundra	7.0	11	90-100	Lower Yukon River, foothills
Wet Tundra	6.6	20	100	Yukon River delta, scattered lowlands in region
Alpine Tundra and Barren Ground	21.1	25	15	Mountain areas above 2,000 feet
Coastal Marsh	Unknown		100	Yukon delta
TOTAL:	123.2			

SOURCE: University of Alaska, Arctic Environmental Information and Data Center. 1976. Alaska Regional Profiles: Yukon Region.

The Yukon-Kuskokwim Delta is a maze of meandering streams and small lakes grading from salt marsh on the coast into freshwater marsh and eventually wet tundra. Tidewater may extent upriver for 30 miles through the sinuous sloughs and backwater channels.

In the interior Yukon Region, lowland spruce and bog-muskeg wetlands are most common. The lower regions of the Yukon-Innoko-Koyukuk Rivers is strewn with lakes and wetlands. These interior wetlands are a curving mosaic of treeless brushy bogs, backwater channels, and higher islands of lowland spruce forests. Ponds are maintained by river flooding. The Yukon Flats is a 10,800 square mile interior wetland consisting of thousands of freshwater lakes and ponds, and meandering channels lined with scrubby lowland spruce forest and bog-muskeg vegetation.

Other large wetland areas in the Yukon drainage include the upper Yukon-Tanana-Porcupine area, Minto Flats, and the lakes and marshes near Tetlin. The vast floodplains of this river system foster continual growth of high brush vegetation. (University of Alaska, 1976b)

Historic Development

A great deal of prospecting, manual and large-scale hydraulic and hard rock mining has occurred in this region for several metals including gold (placer and lode), copper, tin, platinum, antimony mercury, and others. Placer mining has been the major development activity in the Yukon Region since the 1880's. Mining has been centered in the upper Yukon near Fairbanks (total production was 7.9 million ounces between 1902 - 1970, making this area the state's richest gold producing district), and the Eagle, Circle, Hot Springs, Forty-mile districts. The Kantishna area north of Mount McKinley has produced placer gold and other metals. Hydraulic mining techniques were and still are used on the mineral and gold rich sediments of river terrace and bed formations. The effect of years of mining on the wetlands of this region is largely undocumented. The rerouting of river channels, mining of river terraces, and tailing disposal has probably affected floodplain wetlands to some extent. The cumulative effect on large downstream river lowlands of this increased sediment load is also unstudied. (Clausen, Rothe, Trasky, pers comm.) However, mining operations above the Minto Flats area on the Tanana drainage contributed significant amounts of sediment to the marshes and raised the level of flats enough to affect vegetation types. The result has been a reduction of waterfowl habitat. (Hickok, pers. comm.)

A reindeer industry began in the Bethel area during the late 1800s which ranged these animals in the Yukon-Kuskokwim Delta. The large concentrations of reindeer on the wetlands trampled the vegetation, but wetland impacts are not documented. (Hickok, pers. comm.)

The growth of Fairbanks and the small towns of this region has caused some wetlands loss as well.

SOUTHWEST REGION

Wetland Distribution

The Southwest region covers 67.2 million acres and encompasses the extensive Kuskokwim River watershed, the Bristol Bay region, and the elongated western tip of the state, the Aleutian Islands. The Kuskokwim River defines a broad floodplain running central through the region, buttressed on either side by the Alaska Range and the Kuskokwim Mountains. Table 2-7 summarizes the major vegetation communities, their acreages and primary location within the region. The Southwest contains 18.1% of the potential wetlands of the state and 60% of the region is potential wetlands. A relatively large coverage of tundra as well as spruce forest types occur there.

The Kuskokwim River drainage is predominately covered in tundra vegetation with a limited acreage of hardwood/spruce forest types. The upper Kuskokwim River occupies a broad nearly level floodplain marked with lakes, sloughs, and oxbows interlaced among the lowland scrub and bog areas. The lower river forms the southern arm of the Yukon-Kuskokwim delta, a wetland of several thousand square miles stretching 250 miles northward into the Yukon region. The major features of this immense wetland are its coastal brackish marshes, boggy woodlands, and wet tundra habitat. (University of Alaska, 1976c)

Bristol Bay is a 40,000 square mile remote, mountain enclosed sub-region containing numerous rivers, lakes and wetlands. Coastal marsh, estuaries, and lagoons incise the Bristol Bay shoreline; eelgrass thrives in many embayments. The upland portions of the Bristol Bay watershed contain many large, deep lakes occupying glacial scours and bowls. The Tikchik Lakes, Lake Clark, Iliamna Lake, Naknek, and Becharof Lake are the primary waterbodies.

The scattered treeless islands of the Aleutian chain stretch westward into the Pacific Ocean for nearly 1,100 miles and are the landward pinnacles of a highly volcanic belt. The rocky islands contain few lowland areas and are primarily covered in tundra vegetation of all three types.

TABLE 2-7

SOUTHWEST REGION VEGETATION COMMUNITIES

	Acres (million)	Percent of State Total	Percent Potentially Wetland	Primary Location Within Region
Bottomland Spruce/Hardwood Forest	3.5	19	60	Level flood plains, flooded backwaters- Nushagak and Mulchat- na, Alagnak, Kusko- kwim & Yukon Rivers.
Upland Spruce/ Hardwood Forest	9.3	14	30	Upper areas of the Nushagak and Mulchatna Rivers, Iliamna lake, lower hills near Kusko- kwim River, eastern Kilbuck Mountains.
Lowland Spruce/ Hardwood Forest	6.6	19	95-100	Lowlands, outwash plains and alluvial plains in drainages of Nuyakuk, Kokwok, Kuiachak and Kusko- kwim Rivers.
High Brush	2.6	15	60	Broad river floodplains, Yukon, Kuskokwin, Aniak Rivers.
Low Brush/ Bog Muskeg	.5	5	30	Nixon Fork, confluence of Big and Windy Rivers with middle fork of Iuskokwin River, Nowitna River near the Yukon, Yukon-Kuskokwin delta, floodplains
Moist Tundra	16.8	25	90-100	Upper drainages of Togiak, Nushagak, Mulchatna and King Salmon Rivers, Kilbuck Mountains
Wet Tundra	9.2	28	100	Low coastal area, Yukon Kuskokwin delta, Nushagak, Kuiachak, Ugashik Bay, Port Heiden & Port Moeler

TABLE 2-7 (Continued)

	<u>Acres (million)</u>	<u>Percent of State Total</u>	<u>Percent Potentially Wetland</u>	<u>Primary Location Within Region</u>
Alpine Tundra and Barren Ground	18.7	22	15	Exposed ridges in Kilbuck Mountains and the Aleutians Islands
Coastal Marsh	<u>unknown</u>		100	Coastal inlets and river deltas
Total	67.2			

SOURCE: University of Alaska, Arctic Environmental Information and Data Center 1976. Alaska Regional Profiles: Southwest Region.

Historic Development

In general, the southwest is largely undeveloped. Salmon fishing is the primary industry and is centered in the Bristol Bay region. There are no large urban areas or major roads.

Placer mining for platinum and gold and lode mining of mercury, gold and antimony has been widespread in Goodnews Bay area and Aniak. Aniak is adjacent to the Yukon-Kuskokwin delta and some impact from these operations may have occurred. Very little mining has taken place in the Aleutian or Bristol Bay area.

Several exploratory wells have been drilled in the Bethel Basin underlying the Kuskokwin River delta. Although no large scale development has yet occurred, this area and the Bristol Bay offshore basin are believed to have high petroleum potential. (University of Alaska, 1976c)

SOUTHCENTRAL

Wetland Resources

The southcentral region encompasses 53.1 million acres extending from the southern portion of the Alaska Peninsula northward up the Susitna River valley and eastward across Prince William Sound to Icy Bay. The region includes several mountain ranges and nearly 11,500 miles of coastline. Wetland areas are concentrated in the Susitna, Matanuska, and Copper River valleys, the lowlands and tidal flats bordering Cook Inlet and Prince William Sound and the lake studded lands of the Kenai Peninsula. Several of the major wetlands of this region have been well studied for their vegetative characteristics or wildlife uses (e.g., Knik Arm wetlands, Anchorage wetlands, Potter marsh, Susitna and Copper River wetlands.) Overall the Southcentral region contains large acreages of coastal marsh and tidal flats as well as high brush and spruce forest wetlands covering river floodplains and coastal lowlands. Over 36% of the region is potentially wetland representing 7.4% of the state total. (See Table 2-8)

The southern portion of the Alaska Peninsula and Kodiak Island do not have many large wetland areas. (University of Alaska, 1974)

The Cook Inlet area includes the Matanuska-Susitna River valleys, the Anchorage bowl, upper Cook Inlet tidal wetlands and the Kenai Peninsula. The floodplain of the Susitna River extends for 200 miles in length and has a large number of lakes. Lowland spruce and bog wetlands are plentiful throughout the drainage. Upper Cook Inlet includes extensive unvegetated mud flats exposed by the great amplitude of the tidal exchange in this region (40 ft. tidal difference). (University of Alaska, 1978) Brackish marshes and wet meadows border tidal flats in upper Knik arm and the lower Matanuska River valley.

TABLE 2-8
SOUTHCENTRAL REGION VEGETATION COMMUNITIES

	<u>Acres (million)</u>	<u>Percent of State Total</u>	<u>Percent Potentially Wetland</u>	<u>Primary Location Within Region</u>
Coastal Western Hemlock/Sitka Spruce Forest	5.9	26	unknown	Occurs in the Gulf of Alaska and Prince William Sound to elevations of 2,000 ft. and in Cook Inlet, Alaska Peninsula and Kodiak Island.
Bottomland Spruce/ Hardwood Forest	1.1	6	60	Low river terraces and floodplains of many drainages common in Copper and Susitna River valleys
Upland Spruce/ Hardwood Forest	4.0	6	30	At higher elevations in interior valleys of Gulf of Alaska area; benchlands of low to mid elevation in Cook Inlet area
Lowland Spruce/ Hardwood Forest	4.3	12	95-100	Upper Copper and Susitna River valleys, Kenai Peninsula
High Brush	4.0	22	60	Outwash and mountain soils in southern portion of Alaska Peninsula and eastern Cook Inlet, Kodiak Island, floodplains of the Susitna and Copper Rivers.
Low Brush- Bog Muskeg	.6	6	30	Coastal muskegs occur on Kenai Peninsula and waterways of upper Cook Inlet; interior muskegs are located in the Copper and Susitna River valleys
Moist Tundra	3.6	6	90-100	Foothills and upper river valleys
Wet Tundra	1.0	3	100	Copper River delta and small deltas in upper Cook Inlet area

TABLE 2-8 (continued)

	<u>Acres (million)</u>	<u>Percent of State Total</u>	<u>Percent Potentially Wetland</u>	<u>Primary Location Within Region</u>
Alpine Tundra and Barren Ground	20.9	25	15	On most higher mountain slopes of ranges in the region
Coastal Marsh and Tideland	unknown		100	Along tidal inlets and river mouths of Cook Inlet and Prince William Sound
Total	45.4			

SOURCE: University of Alaska, Arctic Environmental Information and Data Center
1974. Alaska Regional Profiles: Southcentral Region.

The Kenai Peninsula wetlands vary from brackish tidal marshes at the mouth of the Kenai River to a variety of spruce and bog wetlands and lakes along the river floodplains and lowlands. The tidal Kenai Flats are the first wetland in Cook Inlet to become ice-free in the spring and provide the first migratory bird habitat. (U.S. Army Corps of Engineers, 1978)

The Prince William Sound area contains several large wetlands: the Copper River Delta and lowlands, the intermontane Nelchina wetlands and the tidal marshes of the numerous bays, creeks and river mouths. The Copper River Delta contains brackish grass-sedge marshes which grade into freshwater spruce and bog wetlands in the upper river valley. (Bucaria, 1979; University of Alaska, 1974) The tidal flats and marshes of Prince William Sound are small in size and tucked back into inlets and river mouths. (Hogan and Colgate, 1980) The Nelchina wetlands sit in an intermontane basin of lakes, tundra and spruce forest bogs at the headwaters of the Copper, Mulkana and Susitna Rivers.

The Kenai Peninsula wetlands are partially contained in the Kenai National Wildlife Refuge and Kachemak Bay State Critical Habitat area. The Copper River Delta is part of the Chugach National Forest.

Historic Development

The Southcentral region is the most developed area in Alaska, housing over half the state's population. Wetlands losses have been of several types: urban and industrial expansion and recreational developments, highway and railroad construction, oil and gas development, agricultural reclamation, mining and the 1964 earthquake.

The primary urban area is Anchorage, a city situated in a glacial outwash bowl encircled by water and mountains and filled with wetland bogs and creeks. Estimates, based on soil type, have set former wetland areas at 25% of the total Anchorage Bowl area (Huffman, pers. comm.). Many of these were filled and developed for urban and industrial uses during the 1970s. The population of Anchorage has grown from 126,385 in 1970 to 180,740 in 1981 and to over 200,000 in 1982. (Municipality of Anchorage, 1982) (Clausen, Thurston, pers. comm.) Other cities, such as Palmer, Wasilla and Kenai, are also expanding in population. (Parker, pers. comm.)

Oil was discovered in the Kenai National Moose Range (Kenai NWR) in 1957 and portions of the Kenai Peninsula were developed for oil and gas during the 1960s with accompanying growth of towns. Construction of a refinery was completed in 1963 and subsequent expansion has included several tanker terminals, another refinery, petrochemical plant and a liquified natural gas plant. Offshore drilling in the lower Cook Inlet has centered in use of onshore Kenai facilities. (U.S. Army Corps of Engineers, 1978) Seismic exploration for oil and gas in the Kenai Moose Range as well as drilling pad construction has caused the loss of some wetland vegetation. (GAO, 1982)

The construction of the Trans Alaska Pipeline required a terminal port facility for storage and shipment of crude oil. The City of Valdez fills this need with a large industrial port. Some wetlands were lost to this development. Recently, recreational development has focused on the Kenai River and progressed in numbers steadily since the 1970s. The full impact on wildlife and the salmon fishery of boat docks, groins and bank improvements in the Kenai River is currently being evaluated. (Rothe, pers. comm.)

The Homer Area, Kodiak, and several other cities are primary harbors for the commercial fishing industry. Construction of port facilities and fish canneries has probably necessitated some wetland loss. The Southcentral region has the greatest number of highways in the state, as well as the southern portion of the Alaska Railroad. In some instances, these roads have crossed directly through wetland areas, essentially blocking drainage and inundating upstream wetlands. (Hickok, Nickels, pers. comm.) On the other hand, inundation due to hydrologic barriers has created wetlands in at least one case. The Potter Marsh bordering the Turnagain Arm, southeast of Anchorage, was isolated from tidelands by the Alaska Railroad berm in 1916 and, later, the Seward Highway. The impounded water created a fresh and brackish marshland, which is now used by waterfowl, shorebirds and moose. (Bromley, 1981)

Agricultural development in the state is the most advanced in the Susitna and Matanuska river valleys. Some wetlands were reclaimed to pasture and plowed lands in this area during the 1930s and 40s. Mining in the Southcentral region has focused on lode and placer gold and chromite ore in the Willow Creek, Hope and Valdez Creek Districts. As with most mining operations in the state, the local and regional effects are largely undocumented.

The Alaskan earthquake of 1964 caused the largest change to wetlands of the Southcentral region. The 8.2 magnitude earthquake caused a 6-foot uplift in the coastal portions of the Copper River Delta, and a corresponding drop in land elevation in Knik and Turnagain

Arms and Portage regions. Consequently, in several areas new lands were converted to wetland while others were raised above high tide levels and now have different types of vegetation. The overall effect in terms of wetlands lost versus those created is unknown. However, some waterfowl habitat was lost in the Copper River Delta. (Hickok pers. comm., Alaska Department of Fish and Game, 1981, Bucaria 1979)

SOUTHEAST

Wetland Resources

The Southeast region is a jigsaw puzzle of inland waterways, fiords and inlets, islands and rocky shorelines. Sixty percent of the total land area lies on the mainland while islands encompass the remainder. The total surface area of the region is 42,000 sq. miles with over 30,000 miles of highly dissected shoreline. The steep topography creates a vertical progression of vegetation from intertidal flats and shoreline marshes to coastal forests interspersed with muskegs and eventually to alpine tundra and barren rocky pinnacles. Few flat expanses of land are available to accommodate wetlands. The majority of wetland acreages are narrow bands of intertidal and coastal marsh along islands and shoreline, the grass-sedge meadows of Yakutat delta and Stikine River, and bog muskegs integrated into the coastal forests. Table 2-9 summarizes the vegetative communities of the region and their potential wetland characters. Overall this region does not contain large wetland areas.

Historic Development

Development of the southeast historically has hinged on several resources: minerals, fish, fur and timber. Juneau is the state capital and largest city of the region and was founded as a gold mining town. The expansion of Juneau and other southeast cities is necessarily out on to filled wetlands. These urban areas are perched between the ocean and the mountains in a narrow zone of flat, and often wet, land.

Placer and lode gold and copper mining, sand and gravel mining and other mineral extractions occurs in the region. Gold mining has been quite productive, especially in the Chichagof, Juneau, Ketchikan and Hyder districts. The effects of these operations upon adjacent and downstream wetland and tideland areas is unknown.

Timber harvesting, another main industry, has required the filling of some tidelands for log booms and barge transfer sites. However this acreage is relatively small. (Harmening, pers. comm.) The long term effect of timber removal and erosion on tidelands and wetlands is largely unknown. (Nishimoto, pers. comm.)

TABLE 2-9

SOUTHEAST REGION VEGETATION COMMUNITIES

	<u>Acres (million)</u>	<u>Percent of State Total</u>	<u>Percent Potentially Wetland</u>	<u>Primary Location Within Region</u>
Coastal Western Hemlock/Sitka Spruce Forest (containing three interspersed sub- communities: true forest, grass-sedge meadows, muskeg)	16.6	74	unknown	True forest, most slopes between sea level to 3,000 feet Yakutat Forelands, grass-sedge meadows and muskeg
Wet Tundra	.3	1	90-100	Some slopes between forest and alpine zones
Alpine Tundra and Barren Ground	7.5	9	15	Most slopes above 3,000 feet
Coastal Marsh and Tidelands	Unknown		100	Numerous tidal inlets and river mouths
Total	24.4			

SOURCE: University of Alaska, Arctic Environmental Information and Data Center, 1976. Alaska Regional Profiles: Southeast Region.

PROPOSED DEVELOPMENT IN WETLAND AREAS

Oil and Gas Development

The total oil and gas reserves in Alaska are just now being located, quantified and developed. A good proportion of these reserves underlie state and federal lands and are offered to prospective developers through the leasing process. Figure 3 illustrates onshore and offshore lease tracts which could be offered under state or federal programs. Although leasing schedules are often revised, these areas could be leased within the next 20 years. (Henrickson, pers. comm.) Wetlands overlay much of this land. The Yukon Flats, Bethel area, the Yukon-Kuskokwim Delta and Bristol Bay in particular have shown high potential for petroleum reserves. (University of Alaska, 1976a & b) Lease sales cannot be equated with assured development until exploratory activities affirm economically viable quantities of oil and gas. However, oil and gas development typically leads to filling and disruption of wetland areas. Development of offshore oil reserves also requires the construction of onshore facilities as in the Bristol Bay Basin. In addition, several onshore areas of the Arctic, the Beaufort Sea, the Bethel area, and the Bristol Bay offshore areas are most likely to be subject to exploratory and expanded development activities in the near future. (AOGA, pers. comm.)

Oil and gas related activities are proposed at different levels of development in the three areas of the Arctic region: National Petroleum Reserve Alaska (NPRA), Prudhoe Bay-Kuparuk Fields and the Beaufort Sea, and the Arctic National Wildlife Refuge.

Arctic National Wildlife Refuge

Environmental review for exploratory activities in the Arctic NWR has just begun. The Alaska National Interest Lands Act specifies that such development must be compatible with wildlife reserve functions. No decisions have yet been reached regarding exploratory drilling or the regulations promulgated to control these activities. However some preliminary estimates show potentially large reserves of oil in this area. (Shepard et al 1982, Armstrong, Roff pers. comm.)

National Petroleum Reserve Alaska

Two tracts have been leased in the NPRA and environmental review precursory to lease sales of an additional 12 million acres is underway. A recent EIS (BLM 1982) recommended deletion and deferral of lease tracts in areas of prime waterfowl habitat (Teskekpuk Lake) and caribou calving grounds (Utukok River). Leasing of tracts does not equate with oil development. Exploratory work completed in past

STATE & FEDERAL PROPOSED OIL & GAS LEASE AREAS*

STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
PROPOSED OIL & GAS LEASING PROGRAM
JANUARY 1, 1982

<u>Sale No.</u>	<u>Sale Name</u>	<u>Proposed Sale Date</u>
34	Prudhoe Bay Uplands	Sept. 1982
35	Lower Cook Inlet	Feb. 1982 HELD
36	Beaufort Sea	May 1982 HELD
37	Middle Tanana & Copper River Basins	Aug. 1982
37-A	Chakok River, Exempt	Aug. 1982
38	Norton Basin	-Jan.-1983-CANCELED
39	Beaufort Sea	May 1983
40	Upper Cook Inlet	Sept. 1983
41	Bristol Bay Uplands	Sept. 1984
42	Minchumina Basin	Jan. 1984
43	Beaufort Sea	May 1984
45	Hope Basin	Sept. 1985
46	Holitna Basin	Jan. 1985
47	Kuparuk Uplands	May 1985
48	Kuparuk Uplands	Jan. 1986
49	Cook Inlet	May 1986
50	Camden Bay	Sept. 1986

Except for lease sales 37 and 37-A, no decision has yet been made on whether the state will conduct these sales.

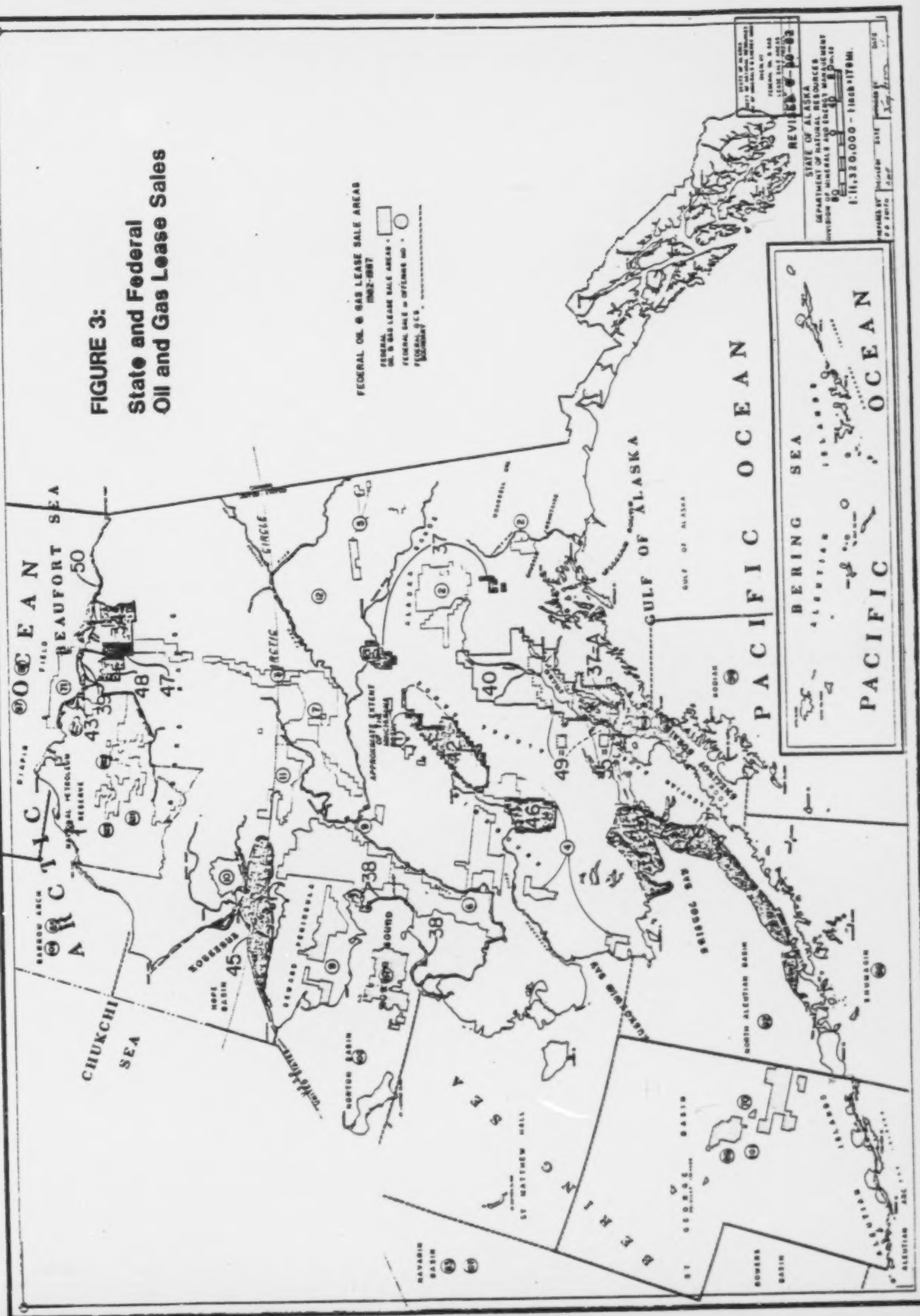
FEDERAL OIL AND GAS LEASE SALE AREAS**
1982-1987

<u>Sale or Offering Number</u>	<u>Upland or OCS</u>	<u>Area Name</u>	<u>Sale Date</u>	<u>Tract On Overlay</u>	<u>Tract Not Available</u>
RS-2	OCS	Lower Cook Inlet	6/82	x	
71	OCS	Diapir Field	9/82	x	
57	OCS	Norton Basin	11/82	x	
70	OCS	St. George Basin	2/83	x	
83	OCS	Navarin Basin	3/84		x
87	OCS	Diapir Field	6/84		x
88	OCS	Gulf of Ak-Cook Inlet	10/84		x
89	OCS	St. George Basin	12/84		x
85	OCS	Barrow Arch	2/85		x
92	OCS	N. Aleutian Basin	4/85		x
86	OCS	Shumagin	6/87		x
100	OCS	Norton Basin	10/85		x
107	OCS	Navarin Basin	3/86		x
97	OCS	Diapir Field	6/86		x
99	OCS	Kodiak	10/86		x
101	OCS	St. George Basin	12/86		x
109	OCS	Barrow Arch	2/87		x
1	Upland	Minchumina	4/82	x	
2	Upland	Denali	7/82	x	
3	Upland	Utility Corridor	9/82	x	
4	Upland	Lime Hills	3/83	x	
5	Upland	Fortymile	7/83	x	
6	Upland	Lower Yukon	11/83	x	
7	Upland	Tanana	3/84	x	
8	Upland	Kvichak	7/84	x	
9	Upland	Seward Peninsula	11/84	x	
10	Upland	Noatak	3/85	x	
11	Upland	Bettles	7/85	x	
12	Upland	Steese/White Mtn.	11/85		x
821	Upland	NPRA	1/82	x	
822	Upland	NPRA	5/82	x	
823	Upland	NPRA	7/83		x

*Refer to Figure 2 for locations

**The BLM uplands schedule is for offerings which will be non-competitive unless individual areas are otherwise classified by the U. S. Geological Survey. The 1982 federal uplands sales are expected to occur as listed. The other federal sale dates may change. They are presented here to indicate the full scope of planned oil and gas leasing activity in Alaska. In addition to the sales shown here, BLM will manage the annual leasing of 2 million acres of National Petroleum Reserve Alaska lands. The first two sales, totalling 2 million acres, were held January 27 and May 26, 1982. Another 2 million-acre sale is planned for July 1983.

FIGURE 3:
State and Federal
Oil and Gas Lease Sales



decades in NPRA has not uncovered discoveries of large oil reservoirs like those of Prudhoe Bay. Several small natural gas fields and oil reservoirs have been discovered but no large developments has proceeded to date. (U.S.G.S., 1979)

Canning to Colville River

Between the Canning and Coville Rivers, lies the state leased lands most likely to be explored and developed for oil. Additionally, the recent Diapir field leases offshore in the Beaufort Sea, along with other possible Beaufort Sea development, could significantly increase the need for docks, causeways and construction of onshore facilities. (AOGA, pers. comm.) The Prudhoe Bay field is not expected to increase a great deal over its present areal coverage. The Kuparuk field has most recently expanded and will continue to do so as more oil reservoirs are tapped.

The possible cumulative impacts of oil and gas development in the Arctic region on wildlife and wetlands is estimated as inconsequential by some and disastrous by others. Current planning by both oil companies and the state and federal resource agencies for development in Alaska takes these factors seriously; however, no yardstick exists for estimating the ultimate level of development which is compatible with wildlife. The calculation of this relative level is largely a guess by all parties concerned.

Mining

The mineral and coal resources of Alaska are quite large and deposits are often located in remote regions. Although all types of minerals exist, two basic forms are recognized: placers and lode. Each requires a different type of extraction process which can have various effects on the immediate and surrounding landscape. Figure 4 illustrates the general areas of mining activity and large development projects in the state. The mining claim blocks indicated contain numerous mining claims for one or several minerals over a small land area. Several of these proposed and ongoing projects are noteworthy in relation to wetlands.

Placer mining occurs on a small scale, such as with hand-held suction dredges or a single bulldozer. In contrast, some placer mining operators use several large bulldozers and giant hydraulic hoses which are capable of removing tons of river gravels from terrance formations each day. These types of operations are concentrated in the Circle and Kantishna districts, Eagle and Fairbanks areas and creeks along the Steese Highway of the Yukon region; the Peters Creek area near Talkeetna; creeks along the Parks Highway; Resurrection and Canyon Creeks near Hope, and in the Haines and Juneau areas. (Soderlund, pers. comm.) Incidental miners are distributed all over the state with a total of 400 mines statewide. (Bundtzen et al, 1982).

Several large lode mineral mining projects are in the planning and exploratory stages. In the northwest, the Red Dog mine, north of Kotzebue, encompasses a high composition deposit of lead, zinc and silver. The Bormite mine is also in this region. The southwest and southern Yukon regions are being explored for lead, zinc and silver. The Denali copper deposit in the southcentral region has been explored but not yet developed. The large asbestos deposit near Eagle in the upper Yukon may eventually be developed. The Kennicott copper and silver deposit in Chitina Valley have been mined in the past and may be producing again. The Beluga coal fields west of Anchorage are under planning for development now. These fields underly several thousand acres of wetlands and contain estimated reserves of 270 million tons of coal. Two large deposits in the southeast, the U.S. Borax molybdenum mine and the Green Creek deposit on Admiralty Island are undergoing exploration. The Bering River coal field in Chugash National Forest is adjacent to the Copper River Delta and would necessitate construction of a road crossing the upper delta. (Harnisch, pers. comm.) Many of these large deposits would require construction of lengthy roads which must cross wetlands, (e.g., Red Dog Mine). Sand and gravel mining in the Arctic region and Palmer area is also an expanding industry. (Bundtzen et al, 1982)

The implications of these mining developments for wetlands are widespread and different for each case. Several would directly affect wetlands through open-pit and strip mining, others could indirectly by increasing stream sediment loads.

Urban Development

Urban development is greatest in the Anchorage area and coastal towns of the Southcentral and southeast regions. The limited amount of private property in the state coupled with the shortage of suitable land have pushed urban growth from Anchorage north towards Palmer and Wasilla. In addition, the population of the state is steadily increasing primarily due to immigration. The south central area is accommodating most of this growth. Recreational and tourist facilities have also expanded in recent years. These events cause localized filling of wetlands and will continue to exert pressure on remaining areas as buildable land supplies decrease.

Industrial development in the Anchorage area is also increasing with consequent demand for port and transportation facilities.

Hydroelectric Projects

The Alaska Power Authority (APA), a division of the State Department of Commerce and Economic Development, is responsible for planning and development of power sources for the state. Coal, oil, waste heat recovery, wind and hydroelectric are feasible energy sources. The

FIGURE 4:
State Mining Blocks Map

- Major active claim blocks
- ▲ Development project and claim blocks

SOURCE: ADGGS Mining Information Office's Kard system for claim notices received by Dec. 31, 1981

▲ Development project and claim blocks

SOURCE: ADGGS Mining Information Office's Kardex file system for claim notices received by Dec. 31, 1981



majority of projects are in the southcentral and southeast regions where peak demands are greater. Power requirements in the Southcentral region increased by 270% between 1970-77. Largest of the hydroelectric projects is the Susitna dam complex which would create two reservoirs 48 and 26 miles in length. Floodplain wetlands would be inundated by this project. (Alaska Power Authority, 1982) Other hydro projects either under construction or in the planning stages include Swan Lake, Tiee Lake and Green Lake in the Southeast and Terror Lake, Silver Lake, Solomon Gulch, Grant Lake and Bradley Lake. Most of these projects would involve some encroachment into wetland areas from building or inundation. (Gleason, pers. comm.) The Bethel area may also develop several hydro projects at several locations; feasibility studies are underway. The potential loss of wetlands through these projects must be reviewed by APA through their environmental studies.

REGULATORY FRAMEWORK

REGULATORY FRAMEWORK

INTRODUCTION

The regulation of human activities in wetlands in Alaska is the direct or indirect concern of a number of federal, state, and local government agencies and authorities. These constitute a network in which there are both gaps and overlaps. While the Army Corps of Engineers 404 permit review process provides the principal means through which authorities are expressed, several state agency programs also exert some regulatory control over particular types of activities or geographic areas independent of the 404 program. These are not necessarily specific to wetlands but to the extent that they apply in areas where extensive wetlands are present, they overlap the 404 program in some degree.

The following discussion reviews the principal agencies and programs which affect development and conservation of wetlands in Alaska. Direct regulation of discharge of fill in wetlands through the 404 permit and coastal zone management program involves the Corps of Engineers Alaska District, U.S. Fish and Wildlife Service (FWS), U.S. Environmental Protection Agency (EPA), National Marine Fisheries Service (NMFS), and state and local agencies such as Alaska Department of Fish and Game (ADFG), the Office of Coastal Management, and Department of Environmental Conservation, coordinated by the State Division of Policy Development and Planning (DPDP). These agencies evaluate impacts of proposed development and determine whether an activity should be permitted, modified, or denied. Other agencies have permit authorities which affect wetlands only indirectly. These include the Federal Bureau of Land Management, Federal Energy Regulatory Commission, U.S. Coast Guard, and state agencies such as Division of Minerals and Energy Management (DMEM) within the Alaska Department of Natural Resources (ADNR), and Alaska Department of Environmental Conservation (ADEC). In addition, local governments must also issue use permits for projects within their boundaries and under the authorities of their charters.

This framework of regulation may be unclear or intimidating to the unfamiliar applicant. Many of the agencies are empowered by only one or two statutes or rules of relatively limited scope and focus. Each reviews and judges projects within the constraints of its particular mandate, suggesting modifications to a project based upon its responsibilities to protect or develop a given type or set of resources. Although each separate program considered individually may be straightforward, the combination of steps and requirements is frequently viewed as burdensome.

In the 404 Program, the final balancing of each agency's specific interests and recommendations, along with the effects of the proposed project, lies with the Alaska Corps District. The Corps is the only government agency with statewide authority, which weighs a range of environmental effects and losses in wetlands against development benefits in accordance with public and private needs.

FEDERAL SYSTEM

The federal presence has always been substantial in Alaska, even following statehood in 1959. Federal interests and authorities currently take several forms: the allotment of lands among native, state, and federal interests under congressional acts; the management of large tracts of federal lands; the regulation of particular activities through various permit programs; and federal funding assistance to state and local governments, such as grants-in-aid. Actions taken under any of these conditions all have considerable effects and implications for wetland areas. The most pervasive federal laws, such as Alaska Statehood Act (1959), the Alaska Native Claims Settlement Act (ANCSA, 1971), and Alaska National Interest Lands Conservation Act (ANILCA, 1980), are broad and complex statutes which relate to wetlands only in relation to the disposition and management of federally owned wetlands. These acts receive only a cursory review here. Other application federal laws and regulations are examined in the context of the agencies that implement them and their jurisdictions.

Laws and Directives with General Applicability

National Environmental Policy Act (1969)

NEPA and its implementing regulations (revised 1978) set forth the basic national charter for protection of the environment. Major actions proposed by federal agencies are subject to NEPA and generally require an environmental assessment (EA) or environmental impact statement (EIS); actions in which federal agencies have permit or licensing authority, or provide federal funds are also subject to NEPA. A lead agency must keep a record of decision to document reasons for requiring or not requiring an EIS.

NEPA is important in particular to Corps Sec. 404 and Sec. 10 permit applications, as well as federal oil and gas lease sales, which are subject to environmental review under NEPA. Assessment of potential environmental effects produces a data base upon which decision makers may draw. NEPA in itself does not assure protection to wetlands in Alaska; it does, however, reinforce the Corps' "public interest review" involved in permit applications.

Executive Order 11990: Protection of Wetlands

Executive Order 11990, promulgated by President Carter in 1977, recognizes the significance of wetlands and requires federal agencies to minimize the destruction or loss of wetlands in managing their lands, providing federal funds, or carrying out their own public works projects.

The executive order established several major requirements for federal agencies to fulfill before authorizing new construction in wetlands: 1) determine whether there is a practicable alternative to the action. If so, the action shall not be undertaken in wetlands; 2) include practical measures to minimize harm to wetlands (where no alternative upland locations exist for a proposed project); 3) preserve and enhance the natural and beneficial values of the wetlands; 4) involve the public early in the assessment of any action proposed in wetlands.

E.O. 11990 is theoretically an important directive to all of the federal agencies that manage federal land in Alaska, sponsor federal projects, or provide funding assistance for state and local projects. Since not all federal projects are subject to the provisions of the Section 404 program, few are subject to Section 10, and NEPA provides general environmental guidance only, E.O. 11990 serves as the one directive which is specific to projects involving wetlands.

As agencies complete land management plans and projects for federal lands in Alaska, the importance of this order will become more apparent. At present its directive is generally adhered to in development projects within federal lands (Sternmark, pers. comm., Harnisch, pers. comm., Henrichson, pers. comm., Vivion, pers. comm.).

Executive Order 11988: Floodplain Management

President Carter issued E.O. 11988 in 1977, setting forth the requirement that federal agencies' programs and procedures either avoid encroachment in floodplains or mitigate flood losses where encroachment is unavoidable. Like E.O. 11990, the floodplain management order places an obligation on federal agencies to coordinate efforts and avoid unnecessary project impacts.

The Floodplain Management E.O., as well as the National Floodplain Insurance Program of the Federal Emergency Management Agency, are only indirectly beneficial to wetland protection in Alaska, where floodplains often are many miles wide. The thrust of FEMA's program is flood risk management, to minimize probability of flood by controlling encroachment into floodplains and, by establishing design standards, to reduce hazard risk to human settlements (e.g., minimum first floor elevations). Protecting the intrinsic natural values of the floodplain is secondary.

In view of the present limited level of development within flood-plans in Alaska, and the limited number of communities that are participating in the Floodplain Insurance Program, implementation of this order may be more evident in future planning.

Coastal Zone Management Act (1972)

The Coastal Zone Management Act, adopted by Congress in 1972, addresses a range of coastal planning issues, wetland protection among them. Instead of directly regulating coastal regions of the United States, the act provides for funding assistance to states which meet the criteria of the CZM Program by defining a Coastal Zone, identifying critical planning areas within it, designating appropriate uses, and establishing an effective means of implementing state and local programs to "influence" coastal land use. Concern for wetlands was specifically addressed in the 1980 reauthorization of the CZMA.

The program is administered by National Oceanic and Atmospheric Administration (NOAA) and its Office of Coastal Zone Management (OCZM). Under Section 305, OCZM administered grants to states, including Alaska, for development of their own programs. Under Section 306 of the act, grants were awarded for implementing parts of the Alaska Coastal Program under the Alaska State Coastal Management Program. The authority of the Coastal Management Program is expressed through a determination of consistency of private, state, and federal projects with the policies adopted by the Alaska Coastal Policy Council.

Alaska Native Claims Settlement Act; Alaska Statehood Act; Alaska National Interest Lands Conservation Act

These three acts bear the primary responsibility for present land ownership patterns in the state. The 1971 Alaska Native Claims Settlement Act (ANCSA) is a landmark in federal legislation. Aboriginal land claims were settled by allotting of 44 million acres of native-chosen lands, through the creation of both regional and village corporations to manage these holdings. Congress was to act to reserve another 80 million acres of conservation lands (d-2 lands), to be set aside by the Secretary of the Interior.

The Alaska National Interest Lands Conservation Act (ANILCA, 1980) embodies the resolution of the land selection process initiated in ANCSA. With the passage of the act, 131 million acres were designated as National Parks, National Monuments, National Wildlife Refuges, National Wilderness Areas, National Conservation Areas and Recreation Areas, Wild and Scenic Rivers, and National Forests (see Tables 3-1 to 3-6). The act also explains the relationship between native and federal land claim status. One hundred and three million acres of state entitlements, specified in the 1958 Alaska Statehood Act, were reestablished by ANILCA, and the

state's deadline for choosing these lands was extended for 35 years. ANILCA outlined a number of special studies of areas and wildlife populations as well as the type of resource uses allowed in each type of land unit.

While neither of these statutes deals directly with wetlands, they provide direct protection to several of the state's major wetlands as National Wildlife Refuges (NWR) and National Parks. In addition, land-use management plans and resource inventories for each land unit are required. ANILCA states that permissible land uses, such as mineral, oil and gas leasing, must be compatible with the purpose for which the unit was created, thus giving land planning a definite conservation path. Subsistence use of public lands is a high priority, and development activities are subject to preserving either subsistence values or wildlife populations and their habitats, including wetlands. Most conservation land units are closed to new mineral entry and state and native claims. However, existing valid mining claims must be administered by the land management agency. Surface management of public mining regulations (43CFR subpart 3809) requires a plan of operation including restoration provision be provided by each mining operator. The numbers and type of these activities varies within each land management system. Some of these operations affect wetlands. Table 3-1 summarizes the major federal land management agencies and their activities.

Land Management Agencies

National Park Service

The National Park Service manages its lands for preservation and protection and recreational use and enjoyment by the public. Of the 51,196,000 acres currently under Park Service management in Alaska, the acreage of wetlands varies in each park unit (see Table 3-2). None of the parks was created to specifically preserve wetland habitats. (Sternmark, pers. comm.)

The Park Service is currently completing general management plans and resource inventories for the parks. In accordance with executive order 11990 and Corps 404 regulations, the Park Service is attempting to site park visitor facilities, including any access roads away from wetlands as much as is practicable (Sternmark, pers. comm.).

The parks are not open to new mining claims or oil and gas leasing; however, approximately 3,000 valid claims exist of which 1,500 are placer and 1,500 are lode operations. Placer mining activities are most often centered around river bed and terrace deposits and may affect floodplain wetlands. Reclamation activities required usually involve smoothing out tailings and, if possible, re-covering with stockpiled topsoil. (Sternmark, pers. comm.)

TABLE 3-1

FEDERAL LAND AND RESOURCE MANAGEMENT AGENCIES IN ALASKA

<u>Agency</u>	<u>Major or Applicable Legislation</u>	<u>Activities Managed</u>	<u>Interaction with 404 Regulatory Process</u>
Bureau of Land Management	Federal Mining Law of 1872 Federal Land Planning Management Act (FLPMA) Public Law 96-514 - oil & gas leasing in NPRA ANILCA Federal Settlement Act of 1896	- oil & gas lease sales - mineral lease sales - wilderness reviews - land management - oil & gas exploration in NPRA - management of mining claims	404 permits not commonly needed
U. S. Forest Service	Resources Planning Act of 1974 National Forest Management Act of 1976 ANILCA Surface management of public mining regulations FLPMA	- timber harvesting & timber sales - forest land & wilderness management - management of existing mining claims & leases, operation plans - identification of oil & gas & mineral lease areas, preparation of land management plans	404 permits for log transfer sites, access roads to mining activities; fish habitat in-stream enhancement projects
U. S. Park Service	ANILCA Parks Act Surface management of public mining regulations	- management of park lands for preservation & recreation - management of existing mining claims & leases, operation plans - preparation of land management plans	404 permits for access roads to parks

Table 3-1 (cont.)

U. S. Fish and Wildlife Service	ANILCA Migratory Bird Act Land & Water Conservation Fund Act; Surface Management of Public Mining Regulations	- management of wildlife refuge lands - review of refuge lands appropriate for oil & gas leasing, mineral leasing, preparation land use plans - management of existing mining claims, oil & gas leases	404 permits not usually needed; may be for future access roads
Minerals Management Service	Secretary of Interior Order 29-48	- administration of leases & plans operation once lease is opened	404 permits for activities in wetlands applied for by lessee

TABLE 3-2

NATIONAL INTEREST LANDS IN ALASKA

NATIONAL PARK SERVICE UNITS IN ALASKA

AS OF DECEMBER 2, 1980*

Name	Total Acreage	Monument	Acreage Classification		Wilderness**
			Park (Includes acreage classi- fied as Wilderness)	Preserve	
Aniakchak National Monument and Preserve	514,000	138,000		376,000	
Bering Land Bridge National Preserve	2,457,000			2,457,000	
Cape Krusenstern National Monument	560,000	560,000			
Denali National Park and Preserve	5,696,000		4,366,000	1,330,000	1,900,000
Gates of the Arctic National Park and Preserve	7,952,000		7,052,000	900,000	7,052,000
Glacier Bay National Park and Preserve	3,328,000		3,271,000	57,000	2,770,000
Katmai National Park and Preserve	4,268,000		3,960,000	308,000	3,473,000
Kenai Fjords National Park	567,000		567,000		
Kobuk Valley National Park	1,710,000		1,710,000		190,000
Lake Clark National Park and Preserve	3,653,000		2,439,000	1,214,000	2,470,000
Noatak National Preserve	6,460,000			6,460,000	5,800,000
Wrangell-Saint Elias National Park and Preserve	12,318,000		8,147,000	4,171,000	8,700,000
Yukon-Charley Rivers National Preserve	1,713,000			1,713,000	
Totals	51,196,000	698,000	31,512,000	18,986,000	32,355,000

Act established these lands as National

*In December 1980, The Alaska National Interest Lands Conservation Act established these lands as National Wildlife Parks.

**Lands within Parks and Preserves that are maintained as natural areas
SOURCE: Alaska Geographic Society, 1981, Alaska National Interest Lands, Alaska Geographic Society Quarterly, Volume 8, No. 4.

U. S. Fish and Wildlife Service
National Wildlife Refuge Management

This section of the U. S. Fish and Wildlife Service is separate from the ecological services division which reviews 404 permits. This section is charged with management of the immense 76,058,758-acre national wildlife refuge system. (See Table 3-3). Similar to the Park Service, the refuge manager and staff must prepare a land management plan prescribing appropriate land uses in the refuge, including oil and gas lease and mineral lease areas. Many of the refuges, such as the Kenai NWR, Yukon Delta NWR, Yukon NWR and Arctic NWR, contain large tracts of wetland and wet tundra. Oil and gas and mineral leasing could be allowed in these areas if deemed compatible with wildlife uses as specified in ANILCA and as judged by the refuge manager. No management plans are completed for any of the refuges (Vivion, pers. comm.). In addition, ANILCA specifies that Yukon Flats NWR is not closed to agricultural development and its use is to be evaluated by FWS on a case-by-case basis.

The Arctic NWR was subject of a special section of ANILCA requiring a resource inventory and formulation of a set of regulations governing oil and gas exploration activities which would offset impacts on fish and wildlife or their habitats. Both the draft regulations and EIS have just been released for public review. The explicit language in ANILCA, in regards to the preservation of wildlife and their habitats, supports wetland management as a prime focus in any oil and gas leasing activity in the Arctic NWR (Fish and Wildlife Service, 1982).

Bureau of Land Management

The Bureau of Land Management (BLM) has multiple responsibilities in managing its lands and the resources of undesignated federal lands in Alaska. BLM manages both surface and subsurface resources in the White Mountains National Recreation Area and Steese National Conservation Area (See Table 3-4). The areas are open to existing mining claims and the conservation area is open to new mining claims. BLM administers all plans of operation for these claims as well as land use planning activities.

BLM is also mandated to manage the subsurface estate of all Alaska national interest lands and undesignated federal lands through a program of oil, gas, and mineral resource review and leasing. (See Figure 2). The land managers for the National Wildlife Refuges and National Forests must determine the compatibility of oil, gas and mineral leasing in these areas with other resources in their management plans. BLM manages all lease sales on national interest lands; however, no land use plans are complete for ANILCA lands, and only the Kenai NWR has oil and gas activity from former drilling operations dating from the 1950's.

TABLE 3-3

NATIONAL INTEREST LANDS IN ALASKA
NATIONAL WILDLIFE REFUGES (NWR)*

<u>Name</u>	<u>Total Acreage</u> (Includes acreage classified as wilderness)	<u>Wilderness Acreage</u> (Lands within each NWR that are maintained as natural areas)
Alaska Maritime NWR	3,548,783	2,460,000
Alaska Peninsula NWR	3,500,000	
Arctic NWR	18,054,624	8,000,000
Becharof NWR	1,200,000	400,000
Innoko NWR	3,850,000	1,240,000
Izembek NWR	320,893	300,000
Kanuti NWR	1,430,000	
Kenai NWR	1,970,000	1,350,000
Kodiak NWR	1,865,000	
Koyukuk NWR	3,550,000	400,000
Nowitna NWR	1,560,000	
Selawik NWR	2,150,000	240,000
Tetlin NWR	700,000	
Togiak NWR	4,105,000	2,270,000
Yukon Delta NWR	19,624,458	1,900,000
Yukon Flats NWR	8,630,000	
Totals	76,058,758	18,560,000

*In December 1980, The Alaska National Interest Lands Conservation Act established these lands as National Wildlife Refuges.

SOURCE: Alaska Geographic Society, 1981, Alaska National Interest Lands, Alaska Geographic Society Quarterly, Volume 8, No. 4.

TABLE 3-4

NATIONAL INTEREST LANDS IN ALASKA

BUREAU OF LAND MANAGEMENT

	<u>Acres</u>
White Mountains National Recreation Area	1,000,000
Steese National Conservation Area	1,200,000
Undesignated Lands (including National Petroleum Reserve - Alaska)	80 - 140,000,000 acres*

*Land acreages are subject to change from settlement of state and native land claims.

SOURCE: Alaska Geographic Society, 1981, Alaska National Interest Lands, Alaska Geographic Society Quarterly, Volume 8, No. 4 and BLM public information office, Anchorage, Alaska.

On BLM-managed lands the planning process is similar. Nine area management plans will eventually be completed, identifying the oil, gas and mineral resources of the area as well as the surface resources and their sensitivity to development. Developments considered include land opening to the full complement of mineral and oil and gas extraction activities as well as mining claims under the 1872 mining law and land disposal under the 1896 settlement law. After completing an environmental assessment on a lease sale, a notice of the sale, complete with any stipulations attached from the ANILCA land managers or the BLM, is distributed to the state and federal agencies, industries and special interest groups and public for a 30-day review. After such review, the leasability of lands is determined and an announcement of those lands to be offered in the sale is published in the Federal Register. Outside of the NPRA, BLM lease sales are on a non-competitive basis due to the lack of prior exploratory activity and unconfirmed occurrence of subsurface resources (43CFR 3100). Non-competitive bidding requires the applicant to file a bid at a random basis over a large area, not for a particular lease tract as in competitive sales (Henrichson, pers. comm.).

To date, BLM has had two tracts open for leasing (Minchumina and Denali). Once the lease is bid, the Minerals Management Service administers the lease, plan of operation, and drilling permits.

BLM has no standard set of lease stipulations or particular conditioning of plans or sales in regards to wetland protection. More likely, a bidder would be informed of the need to obtain a 404 permit from the Corps (Henrichson, pers. comm.).

Under a separate legislative mandate, BLM, in conjunction with the U. S. Geological Survey and U. S. Fish and Wildlife Service, is responsible for identifying and managing oil and gas and mineral leases in the National Petroleum Reserve Alaska. According to Public Law 96-514, BLM is to offer 12 million acres for lease between 1983-1987. Two sales have been held since 1982, with a total of 905,585 acres leased. New lease sales are the subject of environmental review at this time and are scheduled to offer 2 million acres a year (BLM October 1982a U.S.G.S. Dec. 1979). Proposed stipulations to the lease sale include avoidance of certain wetland areas important to caribou and waterfowl. (Gilliam October 1982, BLM October 1982b).

U. S. Forest Service

The U. S. Forest Service manages the Chugach National Forest (NF), Tongass National Forest, Admiralty Island and Misty Fjords National Monuments. (See Table 3-5). Forest Service lands are designated as both wilderness areas and national monument lands and forest lands, and each is under separate management prerogatives. Generally, the Forest Service lands are open to multiple use management as is consistent with

TABLE 3-5

NATIONAL INTEREST LANDS IN ALASKANATIONAL FORESTS

<u>Monuments/Wilderness</u>	<u>Acres</u>	<u>Total Acreage</u>
CHUGACH NATIONAL FOREST		5,940,000*
TONGASS NATIONAL FOREST		16,000,000*
WILDERNESS AREAS		
Admiralty Island National Monument	900,000	
Misty Fiords National Monument	2,136,000	
Coronation Island	19,122	
Endicott River	94,000	
Maurelle Islands	4,424	
Petersburg Creek-Duncan Salt Chuck	50,000	
Russell Fiord	307,000	
South Baranof	314,000	
South Prince of Wales	97,000	
Stikine-LeConte	443,000	
Tebenkof Bay	65,000	
Tracy Arm-Fords Terror	656,000	
Warren Island	11,353	
West Chichagof-Yakobi	265,000	
Total Wilderness Acreage		5,361,899*

*The final acreage of wilderness areas may vary from these figures as official boundary maps are completed and State and Native selection acreages are deleted from these totals.

SOURCE: Alaska Geographic Society, 1981, Alaska National Interest Lands, Alaska Geographic Society Quarterly, Volume 8, No. 4.

TABLE 3-6

NATIONAL INTEREST LANDS IN ALASKAWILD AND SCENIC RIVER SYSTEMWithin National Park Units:

Alagnak
Alatna
Aniakchak
Charley
Chilikadrotna
John
Kobuk
Mulchatna
Noatak

North Fork Koyukuk
Salmon
Tinayguk
Tlikakila

Within National Wildlife Refuges:

Andreafsky
Ivishak
Nowitna
Selawik
Sheenjek
Wind

Within Bureau of Land Management Units:

Beaver Creek

Birch Creek

Katmai National Preserve
Gates of the Arctic National Park and Preserve
Aniakchak National Monument and Preserve
Yukon-Charley Rivers National Preserve
Lake Clark National Park and Preserve
Gates of the Arctic National Park and Preserve
Gates of the Arctic National Park and Preserve
Lake Clark National Park and Preserve
Gates of the Arctic National Park and Noatak National Preserve
Gates of the Arctic National Park and Preserve
Kobuk Valley National Park
Gates of the Arctic National Park and Preserve
Lake Clark National Park

Yukon Delta National Wildlife Refuge
Arctic National Wildlife Refuge
Nowitna National Wildlife Refuge
Selawik National Wildlife Refuge
Arctic National Wildlife Refuge
Arctic National Wildlife Refuge

The segment of the main stem from confluence of Bear and Champion creeks within White Mountain National Recreation Area and Yukon Flats National Wildlife Refuge

The segment of the main stem from the south side of Steese Highway downstream to approximately Twelve-mile House on Steese Highway, within Steese National Conservation Area

TABLE 3-6

Rivers outside of designated preservation units:

Alagnak	Those segments or portions of the main stem and Nonvianuk tributary lying outside and westward of Katmai National Park and Preserve
Delta	The segment from and including all of the Tangle Lakes to a point one-half mile north of Black Rapids
Fortymile	The main stem within the State of Alaska plus tributaries
Gulkana	The main stem from the outlet of Paxson Lake to the confluence with Soutdough Creek; various segments of the west fork and middle fork
Unalakleet	Approximately 65 miles of the main stem

Designated for study for inclusion in Wild and Scenic River System:

Colville River	Koyuk River	Situk River
Etiwuk-Nigu Rivers	Melozitna River	Squirrel River
Kanektok River	Porcupine River	Utukok River
Kisaralik River	Sheenjek River (lower segment)	Yukon River (Ramparts section)

SOURCE: Alaska Geographic Society, 1981, Alaska National Interest Lands, Alaska Geographic Society Quarterly, Volume 8, No. 4.

the conservation of fish and wildlife and their habitat. One large wetland area, the Copper River Delta, has prescribed as its primary purpose the conservation of wildlife resources. (ANILCA)

Both of the national forests have completed management plans which outline recommended wilderness areas, multiple use lands, fishery enhancement projects and several alternative management scenarios. The Tongass NF actively sells its timber and is responsible for interacting with the Corps in permitting for roads and log transfer facilities in wetlands. The Forest Service, in recognition of both Executive Order 11990 and Corps permit requirements, attempts to site facilities away from wetlands when possible. Harnisch, pers. comm.; Harmening, pers. comm.). Chugach NF, due to the settlement of various land claims has not sold any timber in several years. However, there are nearly 5,000 mining claims in the Chugach NF, of which 3,600 are placer claims. The Forest Service reviews plans of operation for these and other mining activities. Typically, a restoration plan for floodplains is required. (Harnisch, pers. comm.). The Forest Service has also completed resource and wildlife inventories of the Copper River Delta and other wetland areas within their bounds.

Section 10/404 Regulatory Program

U.S. Army Corps of Engineers

The Corps of Engineers has authority to make decisions about many types of development activities in Alaska wetlands. The following overview does not provide a detailed analysis of the Corps Section 10 and 404 program responsibilities and authorities. Rather, it outlines key elements of the program, emphasizing those components which are most relevant to the Alaska region.

The general elements of the program are familiar:

- Section 9-10, Rivers and Harbors Act of 1899—regulates the diking, filling, and placement of structures ("works") in navigable waterways.
- Section 404, Clean Water Act—regulates disposal of dredge and fill materials in the "waters of the United States." This phrase has been judicially and administratively interpreted to include all streams to their headwaters (5 cubic feet per second, average annual water flow; and contiguous wetlands, including those above the ordinary high water mark in nontidal waters and mean high tide in tidal waters, and areas of sheet flow underlain by permafrost). A nationwide 404 permit regulates dredge and fill activities above headwaters and in isolated wetlands.

Section 10. The 1899 law originally had the intent of protecting waterway navigability by regulating construction of any structures in and/or over the water, excavation or deposition of materials, or other activities affecting the course, location, condition, or capacity of such navigable waterways. In 1968, the Corps revised its policy with respect to review of permit applications, establishing the "public interest review" to respond to growing national concern over environmental values and to incorporate the intent of related federal legislation such as the Fish and Wildlife Coordination Act.

The navigability determination for the waterways of Alaska differs from many other areas of the nation and is largely decided on a case-by-case basis (Reeder, pers. comm.). Navigability is defined by the use of a waterway for interstate commerce and dependent upon several factors: flow levels on the waterway and ability to be floated by boat; ability to land a float plane on the waterbody; historic and present use as a winter transport route; tidal influences.

Section 404. Section 404 of the Clean Water Act regulates the deposition of dredged and fill material in all waters of the United States which extend shoreward to the plane of mean high water in tidal waters and the ordinary high water mark in nontidal waters.

Section 404 legislative and judicial history is long and complex. Several key points emerge: the definition of lateral scope was at first limited to navigable waters but was later expanded to include all waters of the United States, including adjacent or contiguous wetlands. This expanded definition was published in interim final regulations as early as 1975. The placement of fill material was broadly construed (and defined) to include a variety of activities (excavation and removal of vegetation notably excluded); and the geographic scope of jurisdiction was expanded up into the headwaters of navigable waters by 1977.

In 1979, the Alaska District of the Corps extended its permit authority over wet tundra and moist tundra. These tundra types are considered wetland if the vegetation was accompanied by hydric soils and wetland hydrologic characters. This extension of jurisdiction greatly increased the area of the state covered by the program.

The Corps' practice is to issue public notices on proposed projects and invite comments from all interested parties. (See Table 3-7). The Corps can deny permits to those applicants whose projects are determined not to be in the public interest. Generally, Corps permits will not be issued in those instances where required state or local authorizations have been denied.

TABLE 3-7

SUMMARY OF MAJOR REVIEWS OF 404 PERMITS

<u>Agency</u>	<u>Legal Authority</u>	<u>Regulations</u>	<u>Review Factors</u>	<u>Nature of Action(s)</u>
Corps of Engineers	Section 404, Clean Water Act	Regulations for Controlling Certain Activities in Waters of the U.S.; 47FR141 22 July 1982	Overall public interest; balances all factors	Determines if EIS or other action is needed to comply with NEPA; Final permit decision.
U.S. Environmental Protection Agency	Section 404(b), Clean Water Act	404(b) Guidelines for Specification of Disposal Sites; 40 CFR 230; 24 December 1980	Environmental and ecological impact	Comment to Corps on whether projects are acceptable under guidelines
U.S. Environmental Protection Agency	Section 404(c), Clean Water Act	402, Denial or Restriction of Disposal Site; 40 CFR 231; 9 October 1979	----	Veto of Corps action on permit
U.S. Fish & Wildlife Service	Fish & Wildlife Coordination Act; Endangered Species Act; Marine Mammal Protection Act	none (proposed Dec. 18, 1980, p. 83412 of Fed. Reg.)	Impact on habitat, especially of migratory birds	Advisory comments to Corps
National Marine Fisheries Service	Fish & Wildlife Coordination Act, Executive Reorganization Plan No. 4, Marine Mammal Protection Act	none proposed Dec. 18, 1980, p. 83412 of Fed. Reg.)	Impact on habitat, especially of marine mammals and commercial species under federal jurisdiction	Advisory comments to Corps
Alaska Dept. of Environmental Conservation	Section 401, Clean Water Act; 18 AAC 15.180(a)	Alaska Water Quality Standards; 18 AAC 70 and ACMP standards; 6 AAC 80	Effects on water quality and selected habitat values	State certification of activity (required before permit can be issued)
Alaska Division of Policy Development and Planning	Section 307, federal Coastal Zone Management Act	Alaska Coastal Management Standards; 6 AAC 80	Impacts on coastal habitat; appropriateness of use; compliance with local coastal plans	State certification of permit (required before a permit can be issued for coastal areas only)
Alaska Dept. of Fish & Game	Fish & Wildlife Coordination Act	none	Impacts on habitat, especially of species under state jurisdiction	Advisory comments to Corps

Source: State of Alaska, Office of Coastal Management, 1982, Local Planning for Wetlands Management.

The Corps recently issued interim final regulations in July, 1982, with several significant changes in terms of wetland regulation. Several of these changes are noteworthy. The operation of the program was revised, setting time limits for permit processing at 15 days from permit receipt to the issuance of a public notice, a 30-day comment period on the public notice with provisions for a 30-day extension, and a final decision within 60 days from receipt of the application. Timing of final decisions may be delayed for a number of specific factors.

The elevation of permit decisions, now outlined in a new memorandum of agreement between the Department of the Interior and Department of the Army, requires elevation from the district level directly to the Washington office. Formerly, elevations went to the division level first.

One nationwide permit now covers all non-tidal rivers, streams, and their lakes or impoundments, including adjacent wetlands that are located above headwaters. The State of Alaska has expressed its concern over the possible cumulative effect of this regulation and denied 401 certification of this nationwide permit and several others. (Aiken, pers. comm.) In response, the Corps is negotiating regional conditions for several of the nationwide permits in particular areas of the state and requiring the state issuance of a 401 certification for some activities covered by the new nationwide permits. Another revision in these regulations specifies wetlands as being "part of a surface system." This definition may be very difficult to interpret and apply to the many unique hydrologic systems in Alaska (Saling, September 1982).

Environmental Protection Agency (EPA)

EPA's role in Alaska's 404 program is one of program oversight and permit review. The role is more closely defined in a memorandum of agreement between EPA and the Department of the Army and in EPA's 404 regulatory guidelines. The principal areas of EPA's responsibility are in promulgating 404(B) guidelines and criteria for review of permits, review of Congressionally authorized or other federal projects which claim exemption from 404, specific review of proposed discharge sites, review and comment on 404 permit applications, and review of delegation of 404 authority to states. Thus, EPA, in effect, can veto Corps permit actions and define states' 404 programs.

EPA in Alaska continues to administer National Pollution Discharge Elimination System (NPDES) permits under Section 402 (CWA). The state has assumed the responsibility to certify that permitted actions are consistent with states' water quality objectives under Section 401. The NPDES (402) program parallels 404, regulating the point source discharge of wastewater rather than solid material and emphasizing reduction of pollutant discharge (through available technology) rather than alternatives to discharge.

U.S. Fish and Wildlife Service (USFWS)

The Fish and Wildlife Service operates under a number of statutory and administrative authorities but does not have direct permit authority in wetlands. Among these are the Fish and Wildlife Coordination Act, Estuary Protection Act, Migratory Bird Act, Marine Mammal Protection Act, and Endangered Species Act. Under these authorities, the agency's basic responsibilities concern the preservation of migratory birds, fish, waterfowl, and endangered species and their habitats. The Service shares interest in anadromous fish and National Marine Fisheries Service, whose primary responsibilities lie in marine and estuarine resources.

Under the Fish and Wildlife Coordination Act (1958) the USFWS reviews federally permitted, funded, or constructed projects with the goal of protecting and, where possible, restoring the fish, wildlife, and natural values of waters and related wetlands. The Coordination Act, which plays an important role in the Corps' denial or conditioning of permits, mandates that any department or agency of the United States, or any public or private agency under federal permit, license, or funding, proposing to modify any stream or other body of water, shall first consult with the Fish and Wildlife Service to determine the effects of the proposed projects on fish and wildlife resources.

In conjunction with the Corps' Section 10 and Section 404 Permit Program, the Service reviews and provides technical assistance to applicants for federal permits and other developments in or affecting navigable waters. A Memorandum of Agreement between the Departments of the Army and Interior is basic to the coordination process, and the USFWS may elevate Corps decisions to the secretarial level in Washington for final decision.

The criterion of "water dependency" of projects in wetlands is generally not adhered to by FWS personnel in Alaska due to the impracticality of denying the majority of proposed projects which do not meet this criterion. FWS does, however, attempt to comment on the revision of project plans so as to impact the least amount of wetland area (Nickles, pers. comm.; Thurston, pers. comm.).

The Endangered Species Act, recently reauthorized in 1982, requires all federal agencies to consult with Fish and Wildlife Service when any federally funded, authorized, or approved projects or actions might affect the habitat of an endangered or threatened species. The USFWS is directed to identify and list these species and develop plans for their protection and recovery, principally through management of critical habitat. The Act sets forth a formal consultation process (Section 7) that requires first a biological assessment, where the presence of an endangered species is suspected, and mitigation plan in the event of project approval.

The Office of Special Projects of the USFWS is foremost in completing wildlife research and natural resource investigations in many wetland areas. Studies on wetlands experiencing high development pressure are given priority as funding prohibits statewide wetland field research. (Rothe, pers. comm.)

The National Wetlands Inventory mapping project has been under way in Alaska for several years in Alaska for several years and has mapped 4% of the state's wetlands to date, with an estimated 25% coverage by 1986. Primary problems in wetland mapping have been lack of adequate aerial photography and topographic map coverage. (Hall, pers. comm.).

National Marine Fisheries Service (NMFS)

A part of the National Oceanic and Atmospheric Administration in the U. S. Department of Commerce, the National Marine Fisheries Service, like USFWS, has no direct permitting authority. Under the Fish and Wildlife Coordination Act, NMFS reviews federally initiated, licensed, or permitted projects which have the potential of altering aquatic environments and biological resources. Existing or potentially restorable spawning, rearing, food-producing, or other habitats necessary for the survival of marine estuarine, or anadromous resources are of particular concern.

STATE OF ALASKA

Department of Natural Resources (DNR)

This department has a threefold function: 1) completion of resource inventories and assessments; 2) resource research and policy development in the form of state land use plans; and 3) water allocation and resource development.

In relation to wetlands, each of these functions has a particular significance. Resource inventory information typically encompasses both soil and vegetation mapping. The DNR system is capable of digitalized computer mapping, and, in conjunction with the Soil Conservation Service, has produced several inventory maps of wetlands in certain areas of the state (Matanuska/Susitna River Basin).

The Division of Research and Development formulates land use plans for state lands, often in conjunction with local governments. Area land uses for agriculture, residential and commercial uses, are generally designated to avoid wetland areas. (Stoops, pers. comm.) Wetlands may be included as watershed lands or wildlife habitat lands and retained as state public interest lands. The plan undergoes a public hearing process and the Commissioner of DNR has final decisionary powers. The plan then translates into zoning ordinances and incorporated areas for involved local governments and is binding upon DNR in their agricultural development, oil, gas and mineral leasing and land disposal programs.

DNR administers permits and leases for state tide and submerged lands. These lands are available for public uses through a leasing process for projects on long duration (dock construction), and a permit process for short-term activities. Tideland leases and permits are subject to a consistency determination with the coastal program standards prior to approval. DNR also has authority over water rights in the state and may indirectly govern the draining of wetlands through water appropriation.

The Division of Minerals and Energy Management (DMEM) of DNR manages sale of leases for oil, gas, and minerals on state lands. This division also administers lease unit agreements and plans of operation for exploration and production activities. The lease sale procedure applies to large tracts of state lands which may have potential for oil and gas or mineral production. The procedure for lease sale and environmental review is lengthy; Table 3-8 summarizes the state program.

In respect to wetlands regulation, it is important to note that both the Department of Conservation and Department of Fish and Game review each proposed lease sale well before the actual sale and may add stipulations to protect certain environmental features. Their review may be incorporated in a preliminary best finding analysis (Q35 Finding) or a social, economic and environmental analysis (SEEA) and often precedes public notice of the lease sale. A SEEA offers a similar but not as broad review as an Environmental Impact Statement does. (Bond, pers. comm.) After consideration of all these comments, the Commissioner of Natural Resources decides if the lease sale is in the state's best interest. The Commissioner of Natural Resources also evaluates those stipulations requested by other reviewing agencies. However, should he decide not to include a condition, the commissioner of the reviewing agency may appeal the decision to the governor, who has the ultimate authority of decision. Such elevations are rare in lease sales; disagreements between agencies are usually resolved by the commissioners.

Conditions incorporated into lease sales are of a general nature in regard to wetlands and require operators to avoid disturbing or polluting any wetland areas within a lease tract. The areal coverage of a lease tract may be reduced to avoid wetland areas but no tracts have been excluded from lease sales due to the significance of the surface wetlands. (Bond, pers. comm.) When the public notice on the lease is issued, it includes those stipulations which the bidder must adhere to.

The plan of operation covers a specific exploratory or development project within a lease tract. In addition to the general stipulations attached to the lease sale and accompanying unit agreement for the tract, DMEM may include site specific conditions on a plan of operation. When an operator plans a new facility, they must submit a plan of operation application to DMEM. The proposed plan is reviewed by Department of Fish and Game, the Department of Environmental Conservation, and the Division of Land and Water Management of DNR. There is no public review and comment on plans of operation. DMEM completes a review for consistency of the plan of operation with the Alaska coastal management program standards or the approved local coastal plan. After receipt of all agency comments, the director of DMEM decides what conditions should be attached to the plan and the need for modification or denial. Plans are often completely revised or withdrawn for redesign. Occasionally, a plan is denied based on a significant impact to wetlands. (Bond, pers. comm.) As with the lease sale procedure, disagreements between agencies are ultimately resolved by the governor. There is no formal policy or set of criteria for judging the merits of a plan. Generally, DMEM evaluates each plan of operation for its economic benefits and environmental effects and attempts to balance these to some degree. (Bond, pers. comm.)

Department of Environmental Conservation (DEC)

This department has broad, regulatory authority in the areas of water quality control, water supply, solid waste management, tanker and oil terminal facilities, oil spill prevention, pesticides and hazardous substances control, land damage and land and subsurface pollution prevention and sanitation. The department is charged by statute to develop a comprehensive environmental plan for Alaska, and reviews all major development activities in the state to minimize or preclude adverse environmental impact.

The Division of Environmental Quality Operations of DEC administers the Section 401 Water Quality Certification Program under Alaska State Water Quality Standards, and must issue a certificate of reasonable

TABLE 3-8

STATE OF ALASKA, DEPARTMENT OF NATURAL RESOURCES

Oil and Gas Leasing Procedures

1. Approximately 26 to 61 months before a sale is proposed to take place; Department of Natural Resources chooses new areas to add to the leasing program or revises the schedule, based on its assessment of oil and gas potential, industry interest, and informal state agency review. DNR then invites the public to comment on the proposed additions and revisions. The State's Agency Advisory Committee on Leasing (AACL) and officials of potentially affected communities located near proposed sale areas also review the proposed additions and revisions.
2. 24 to 59 months before the proposed sale date: The Five-Year Leasing Program is presented to the Alaska Legislature.
3. 22 to 32 months before the proposed sale date: DNR issues a formal Call for Nominations or Comments to the oil industry, State and federal agencies, and the public for a general sale area shown in the Five-Year Leasing Program.
4. 23 months: DNR analyzes the nominations or comments submitted by the oil industry, interest groups, other agencies, and the public. On the basis of this information, the nomination/comment area is scaled down to the "proposed sale area."
5. 21 months: The availability of the new proposed sale area maps is advertised. The map is sent to potentially affected communities to use in planning for the proposed sale. Other state agencies, including members of the AACL, are also invited to review the proposed sale area boundaries.
6. 15 months: State members of the AACL begin researching and summarizing the data they will contribute to the Social, Economic and Environmental Analysis (SEEA) that is prepared to major sales pursuant to Administrative Order No. 52. A member of a potentially affected community is appointed as ex-officio member of the AACL.
7. 12 months: The Department completes its preliminary geologic analysis of the proposed sale area and provides the economic and engineering units with estimates or ranged reservoir parameters.
8. 10 to 11 months: The draft SEEA is made available to the public and comments are solicited.
9. 9 to 10 months: Public meetings are held on the draft SEEA and additional comments are received.

10. 8 to 9 months: Public review period for draft SEEA ends.
11. 8 months: DNR initiates land status research to determine leasable acreage. Once engineering data are gathered, an economic analysis of a proposed lease sale is begun.
12. 6 months: Geologic analysis, including the identification of potential geohazards, is completed.
13. 5 to 6 months: The draft SEEA is revised as a result of public and agency review. Meanwhile, based on a combination of the information contained in the SEEA, agency comments made directly to DNR, and geological and geophysical information, the proposed sale area boundaries undergo their final revision. A preliminary tract map of the revised sale area is prepared.
14. 3 to 4 months: Final version of the SEEA is printed and distributed.
15. 4 months: A preliminary best interest finding that sets out the issues and facts regarding the proposed sale is made by DNR and is distributed to the public for comment. At the same time, advertisements are published in the proposed sale area stating that the preliminary finding on the proposed sale is available and public response is invited.
16. 3 months: Comments are received from the general public and from communities within the proposed sale area. Final decisions on the sale, tracts to be included, and the mitigating measures that will be enforced on the leases are made on the basis of these comments and those of other state agencies. A final tract map is prepared. A coastal management consistency determination is prepared, and the final best interest decision is written.
17. 2 months: Public notice of the final sale terms is initiated, with a copy of the notice sent to affected communities and to all parties on the DNR oil and gas mailing list.
19. 1 month: A final land status check and identification of third-party interests are carried out.
20. Day zero: The lease sale is held on its scheduled date.
21. Within a week after the lease sale, the apparent high bids are analyzed, and the Commissioner of DNR decides whether to accept the high bids. The winning bidders are notified.

Source: Department of Natural Resources, Division of Minerals and Energy Management, July 1982. Five-Year Oil and Gas Leasing Program, Mid-Year Edition. State of Alaska.

assurance for all wastewater discharges and 404 permit approvals. DEC may place stipulations on both 404 permits and oil and gas lease sales and plans to assure that projects will comply with effluent limitations and standards. DMEM and the Corps may exclude such stipulations; however, DEC does not consider a permit to be legal in such a case. (Flint, pers. comm.) DEC also comments on most major state development actions.

DEC's office of permit assistance has published several pamphlets and a book on the Corps of Engineers permit process, as well as aiding and advising potential applicants. DEC is currently managing an EPA-funded study of Alaska state assumption of the 404 program. (Fowler, pers. comm.).

Department of Fish and Game (DFG)

The Department of Fish and Game is responsible for the management, conservation and development of the fishery, game and fur-bearing resources of the state. The Subsistence division is concerned with monitoring subsistence harvests, uses and needs, and making recommendations for regulating subsistence activities. The Habitat division, in contrast to the other more animal population oriented divisions, must protect, maintain and improve fish and wildlife habitat. Consequently, this division comments on regulatory applications to both the Corps and other state agencies, and frequently condition permits, leases and plans of operation to reduce habitat losses. The division also completes planning and field research on particular species and habitat types, such as wetlands. DFG also administers the Anadromous Fish Protection Act, which requires a permit for all activities completed in a river or stream bed containing anadromous fish habitat (Title 16, Alaska Statutes). For many projects these permits accompany 404 permit actions but are administered singly and require separate review.

Department of Community and Regional Affairs

The Department of Community and Regional Affairs is responsible for rendering state assistance to government at the community and regional level. This is accomplished through financial, advisory, and management assistance.

The community planning division lends technical and financial assistance in development of land use and coastal management plans and local preparations for impacts from major energy developments. In addition, they interpret state and federal legislation and regulations to the municipal councils and planning commissions and assist them in drafting and implementing local planning ordinances.

The Alaska Coastal Policy Council reviews local coastal management plans and must approve the plan prior to its implementation. The Office of Coastal Management is housed within the Division of Policy Development and Planning.

Governor's Office
Division of Policy Development and Planning (DPDP)

The Division of Policy Development and Planning is the coordinator and negotiator for consistency determinations of state coastal policies, with federal actions such as 404 permits and oil and gas leases (Section 307, Coastal Zone Management Act). DPDP solicits and collects comments from other state agencies and local governments, as well as judging the project against either an approved coastal management program, or, in the absence of one, the coastal management standards. The Alaska Coastal Program is a balancing of development and conservation through the planning process along the 34,000-mile coastal zone. Often various state and federal agencies disagree over a project's consistency and approval. In these uses DPDP acts as a negotiator, involving the Fish and Wildlife Service and National Marine Fisheries Service to resolve conflicts (Souby, pers. comm.). Negotiation procedures between the agencies are used most often when the state has a particularly important interest in the project or strong disagreements arise between state and federal agencies (Wolf, pers. comm.).

The final determination is made by the director of DPDP and can be appealed only to the governor by the Commissioner of another agency. In addition, according to State of Alaska Executive Order 54, all state agency actions must be consistent with the coastal programs and standards.

Office of Coastal Management (OCM)

The Office of Coastal Management aids and advises local governments in the preparation of local coastal management plans and helps to make coastal program consistency determinations. OCM formulated the standards for the Alaska Coastal Management Program, which specifically refer to wetlands development and conservation. All structures and discharge of fill material into coastal water must comply with the regulations of the Corps. The standards also specify that estuaries must be managed so as to assure adequate water flow, natural circulation patterns, nutrients, and oxygen levels, and avoid the discharge of toxic wastes, silt, and destruction of productive habitat; and wetlands and tideflats must be managed so as to assure adequate water flow, nutrients, and oxygen levels and avoid adverse effects on natural drainage patterns, the destruction of important habitat, and the discharge of toxic substances.

The Alaska Coastal Policy Council must approve coastal management programs. Currently, there are seven approved coastal plans (Walsh, pers. comm.). The Alaska coastal programs' primary regulatory effect is through the consistency determination process with other permitting agencies (e.g., Corps of Engineers, Department of Natural Resources). Local land use permits must be consistent with either an approved local plan or the state coastal program standards. (Douglas, pers. comm.) Neither OCM or DPDP issue permits for development in the coastal zone.

NATIVE REGIONAL CORPORATIONS

The Alaska Native Claims Settlement Act created thirteen regional native corporations to manage the land and financial resources allotted native groups. Often the regional corporation will manage large areas of subsurface resources in their region. (Shanks, pers. comm.). Although the corporations do not serve as government institutions and do not generally comment on regulatory actions, they are a major group of landowners and developers in the state. Each native is a stockholder in the regional corporation their home is located within, making each corporation representative of a large investment group of Alaskans. The development policies of these corporations, unlike most others doing business in the state, are subject to the attitudes of a native group which is most often intimately involved with Alaskan land and lifestyle. However, no consensus regarding wetland and habitat regulation is apparent in the native corporations. (Shanks, pers. comm.). Table 3-9 lists the Native Regional Corporations.

NATIVE VILLAGE CORPORATIONS

The Alaska Native Claims Settlement Act (ANCSA) gave native villages a choice of incorporating either as non-profit and profit village corporations. Since its passage in 1971, the over 200 Alaskan villages have formed profit corporations. ANCSA allocated each village corporation surface lands of varying acreage for each village, and the inhabitants each hold stock in the corporation. Unlike the regional native corporations who administer subsurface resources and investments over a large area, the village corporations primarily administer surface resources within their localized area.

LOCAL GOVERNMENT

Title 29 of the Alaska Statutes outlines authorities which boroughs and municipalities may exert. Through zoning ordinances and land use planning development activities can be restricted to particular areas. Local governments may also regulate the site and design of subdivisions.

TABLE 3-9

ALASKA NATIVE REGIONAL CORPORATIONS

<u>Corporation</u>	<u>General Geographic Location</u>
Ahtna Inc.	Wrangell Mts., Glenallen Area
Aleut Corp.	Aleutian Chain
Arctic Slope Regional Corp.	North Slope, Arctic Region
Bering Straits Native Corp.	Seward Peninsula and Norton Sound
Bristol Bay Native Corp.	Bristol Bay and Iliamna Lake Area
Calista Corp.	Yukon-Kuskokwin Delta and Nunivak Island
Chugach Natives Inc.	Southcentral Coast, Prince William Sound
Cook Inlet Region Inc.	Upper Cook Inlet, Anchorage
Doyon Ltd.	Interior Yukon Watershed
Koniag Inc.	Kodiak Area
NANA	Kotzebue Sound Region
Sealaska Corp.	Southeastern Alaska

A third important power is the right of local government to regulate activities, including building, solid waste disposal, water and air pollution, and other activities affecting the general well-being of local inhabitants. Local governments also prepare coastal management plans. All of these powers could potentially be used to regulate wetland areas, and, in some cases, protect subsistence lifestyles.

Other Regulatory Programs

DNR Oil and Gas Regulatory Program

The 404 program overlaps with state permitting processes in a few instances. The most publicized of these is the oil and gas lease and plan of operation program administered by Department of Natural Resources, Division of Minerals and Energy Management. The development of oil and gas resources on state lands involves a two-step review process, leasing of tracts and plan of operation approval.

Through lease reviews, the Department of Fish and Game and other state and federal agencies review leasing schedules and may place stipulations upon lease sales. However, it should be noted that lease sale tracts are quite large and conditioning is limited to general stipulations. Table 4-3 lists some conditions which are typically incorporated into leases when wetland areas are involved. These stipulations are under consideration by DNR as standard enclosures to lease sales located in wetlands. (DNR 1982) Additional stipulations in regards to gravel mining in floodplains, construction in floodplains, seasonal drilling to avoid affecting caribou and waterfowl and their wetland habitats are commonly placed on North Slope lease sales. (e.g., Beaufort Sea Sale 36).

The plan of operation is a more site specific development scenario for a lease tract. Those generalized stipulations placed on a lease sale agreement must carry over to the plan of operations within the tract. (Bond, pers. comm.) Each individual exploratory or development project requires a separate plan of operation approval from DMEM. For most projects in which a 404 permit is required, a plan of operation approval is also needed, and the state reviewing agencies and conditions on these two permits are often identical. However, there are several differences between these two programs which make them distinct. The plan of operation is reviewed by four state agencies - the Department of Fish and Game, Department of Environmental Conservation, Division of Land and Water Management and Division of Mineral and Energy Management. DNR does not release the proposed plan for public review

TABLE 4-3

DNR OIL AND GAS LEASE STIPULATIONS *

1. The siting of onshore facilities, except for road and pipeline crossings which will be aligned perpendicular to water courses, will be prohibited within 500 feet of all shorelines, streambanks, and lakes unless it is shown to the satisfaction of the Director, DMEM, that alternative site locations outside 500 feet are not feasible or prudent.
2. Impermeable lining and diking will be required for sewage ponds and onshore oil storage facilities (with a storage capacity greater than 660 gallons). A buffer zone of up to 1,500 feet will be required to separate oil storage facilities (with a capacity greater than 660 gallons) and sewage ponds from freshwater supplies, streams, lakes, wetlands and marine areas unless it is shown to the satisfaction of the Director, DMEM, that such a requirement is not feasible or prudent.
3. All lease activities and structures must be designed to maintain normal water flow or drainage patterns and to allow free movement and safe passage to fish and mammals, both onshore and offshore, unless such a design is shown to the satisfaction of the Division of Minerals and Energy Management after consultation with the Department of Fish and Game, not to be feasible or prudent.
4. Facilities and surface transportation routes should be located to avoid sensitive fish and wildlife habitat and minimize damage to sensitive wetlands, and should be consolidated to the extent feasible and prudent.
5. Disposal of produced waters in upland areas, including wetlands, will be by subsurface disposal techniques, except that the Commissioner of the Department of Environmental Conservation may give consideration to alternate disposal methods where it is shown to his satisfaction that subsurface disposal techniques are not feasible or prudent.
6. Discharge of drilling muds and cuttings to lakes, streams, rivers, intertidal areas and tidally influenced mouths of rivers is prohibited. Drilling muds and cuttings free of hydrocarbon contamination may be discharged to subtidal marine waters, except that in subtidal marine waters shallower than the 3 fathom isobath, discharge will be restricted to the period

occurring two hours before and two hours after each high tide event.

7. The Director, DMEM, may require as a condition for approval of lease operations an environmental training program for personnel involved in exploration or development activities (including personnel of the lessee's contractors and subcontractors). The program should be designed to inform each person working on the project of specific types of environmental, social and cultural concerns which relate to the sale area and to ensure that personnel understand and use techniques necessary to preserve archeological, geological and biological resources.

8. The land in the proposed sale area is contained within the coastal zone and is thereby subject to the Alaska Coastal Zone management Act, AS 46.40. The Director, Division of Minerals and Energy Management, may require, as a condition for approval of lease operations, modifications or stipulations as may be necessary to ensure consistency with the Act, or to otherwise provide for sound planning and management of coastal resources.

9. Plans of operations for lease activities and specific permit applications which are subject to approval by the U.S. Corps of Engineers or which require a Certificate of Reasonable Assurance from the Department of Environmental Conservation should be submitted simultaneously for state agency review and approval, at least 60 days prior to the proposed conduct of such activities.

10. Upon abandonment of drilling sites, roads, buildings, airstrips or other facilities, such facilities will be removed and the site rehabilitated, unless it is shown to the satisfaction of the Director, Division of Minerals and Energy Management after consultation with other state agencies, that such removal and rehabilitation is not in the state's interest.

11. A Spill Prevention, Control and Countermeasure Plan must be submitted to the Department of Environmental Conservation for approval prior to onshore drilling operations and construction of onshore oil and gas storage facilities (with a capacity of greater than 660 gallons), transfer, and transportation facilities.

* All or some of these stipulations may be included on individual leases. They are under review as automatic enclosures or leases in wetland areas.

and comment. The public review of the lease tract prior to a sale is not comparable to a plan of operation review and cannot substitute for it. Local government, conservation groups, federal agencies and other interested parties do not have the opportunity to lend their comments in the plan of operation review. (Anjum, Pichon, Stroebele, Eames, pers. comm.)

Like the lease sale process, the director of DNR uses discretionary authority in including conditions suggested by other agencies on a plan. Should DNR consider a condition inappropriate, an elevation process of negotiation ensues between the directors of the two agencies, then to the commissioners, and finally to the governor who must make the final decision. Such elevations are rare as are denials of plans of operation on the grounds of adverse effects to wetlands. Negotiation and modification of projects occurs more often. (Bond, pers. comm.)

DNR, unlike the Corps, has no set of criteria for weighing the public interest when evaluating a project. Although this process may be completed informally, no regulations or guidelines exist for the agency. (Bond, pers. comm.) In comparing the DNR and Corps program, many agency and government personnel felt a major difference exists between the charge of each program. (Anjum, Huffman, Stroebele, Douglas, Pichon, Bond, pers. comm.) DNR oversees resource development and state revenues from oil leases. The Corps must weigh the public and national interest in wetland areas when approving or denying the filling of wetlands. Despite an apparent redundancy in regulatory functions, these differences set the two programs apart.

Another procedural difference between the Corps and DNR program is the manner in which the state coastal program consistency determination is made. For a Corps permit, DPDP completes the determination after collecting comments from the various state and local agencies and the public. For a plan of operation, DNR makes the determination from state agency comments only. (Douglas, pers. comm.) In order to equate the two processes, DPDP would have to complete the determinations for the DNR program and a public review be instituted.

Currently, the Alaska District is drafting a general permit to cover North Slope projects which are also regulated under a plan of operation. With the exception of projects affecting endangered species or navigation, the GP would cover a particular size and type (as yet undetermined) of project. (Reeder, pers. comm.) A public review period and codification of DNR public interest review criteria and policies is needed to equate these processes. (Huffman, pers. comm.) In addition, some type of exemption would be required to include the stated national interest in migratory waterfowl and wildlife and their habitats into a general permit review process. (Stroebele, pers. comm.) The Corps expects to release the next draft general permit in several months. (Reeder, pers. comm.)

North Slope Borough, Local Land Use Permit

Local borough governments, according to Title 29 of the Alaska state statutes, have the responsibility of regulating activities within their boundaries. On the North Slope, like other areas, the local borough must issue a use permit for oil and gas activities in their boundaries. The local regulation most often overlaps with the 404 program but often expresses a different concern. The North Slope Borough is primarily interested in preserving the subsistence values of wetland habitats through regulation of oil and gas activities. (Anjum, pers. comm.) While this concern may translate into similar permit conditions as those from a state or federal wildlife agency, the basic premise of each differs. In addition, the Corps cannot issue a 404 permit until the Borough approves the project and issues its permit. The Borough supports the 404 program and favors its public interest review and the ability of local government to comment on permits.

The Borough recently released land use regulations governing projects in its boundaries. These policies are listed in Appendix B; those most applicable to oil and gas development are marked by stars. The policies are intended to clearly delineate those features by which the Borough government will judge a project. All mandatory policies are to be met unless such conformance is not possible, in which case best effort policies are to be adhered to. (Anjum, pers. comm.)

Department of Fish and Game, Title 16 Permit

The Department of Fish and Game administers Title 16 permits for modifications to an anadromous fish stream. This permit only affects activities in stream channels. While being instrumental in regulating activities in certain areas of the state, it does not apply to a great deal of wetlands. The permit is designed to protect, to the maximum extent feasible, anadromous fish habitat, including streamside marshes in some cases. All bridge and road crossings, gravel extraction and mining, in or over anadromous stream beds, is regulated by this program. In relation to 404, this state program may, in particular cases, be redundant; however, it is a single purpose program and addresses only anadromous fishery resources. (Clausen, pers. comm.)

Water Quality Certification and Coastal Zone Management

The 401 water quality certification and state coastal management program function through other federal, state and local permitting programs. In wetland areas where DNR plan of operations or tideland leases are not required, 404 may be the only permitting authority through which these two state programs are expressed. Local and state agencies complete their own consistency determinations for their permit reviews.

Program Gaps

One major activity in the state remains unregulated by the Corps -- the disposal of spoils from placer mining in wetland and streambed areas. Placer mines are currently regulated only by the EPA through federal NPDES permits and a combined three agency state permit issued by the DFG, DEC and DNR. Neither of these programs address the adjacent wetlands of the stream upon which tailings may be sidecast. The Corps has not exercised jurisdiction over these activities due to a lack of precedence in their regulation, a political climate against such regulation, and a lack of staff with which to investigate these often remote operations. (Reeder, Williamson, pers. comm.)

The creation of landfills, even if located in wetlands, are not regulated by the Corps but are covered by the 402 program of EPA. The containment berm for the landfill must be permitted under the 404 program. The 402 program reviews projects for their water-quality effects not necessarily their impacts on wetlands.

The disposal of drilling muds and cuttings from oil development is regulated by the Corps due to the need for containment berms. However, the disposal of plowed snow, defined by the Corps as waste not fill, contains gravel from roads on the North Slope and is not regulated by the 404 program. (Reeder, pers. comm.) Neither EPA, DEC, nor any other state agency regulates this activity. (Flint, pers. comm.) Dust production from vehicles, travelling over the gravel roads of the oil fields, typically is not regulated.

Summary

The 404 program is the only program with statewide applicability for regulating filling of wetlands in Alaska. Most types of development are regulated by the 404 program in the State of Alaska as evidenced by case studies in the Arctic, South central and Southeast regions. No major cases were identified in the Southwest, Yukon or Northwest regions. Nevertheless, future mining activities are proposed in these regions, and the Corps is involved in preapplication planning for several large coal and other mineral developments. (Wolfe, Reeder, pers. comm.)

EFFECTS OF REGULATORY PROGRAMS

EFFECTS OF REGULATORY PROGRAM

Alaska, because of its geography, climate, and relatively recent history of intensive development has retained the majority of its original wetlands. These vast areas of wetland lie in areas that are relatively remote from population centers in the state. Therefore, to most applicants the federal regulatory system is seen as an unnecessary imposition to avoid the loss of relatively few acres of wetlands when compared against the perceived benefits of development. In Alaska, regulation of wetlands represents an exercise in how to balance present and projected development with protection of the wetland ecosystems which exist in the state today.

The effects of the agencies and processes that directly govern wetlands in Alaska can be viewed in several ways: 1) in terms of the inherent features or programs (e.g., the scope of geographic and lateral jurisdiction, activities covered, and authority); 2) in terms of their actual exercise or practice by agencies and individuals; and 3) in terms of the net effect on wetlands, such as actual acres of wetland that have been destroyed, filled, protected and/or restored. Our evaluation of the Corps 404 program in Alaska and supporting state and federal programs shall examine all three of these factors as well as the particular concerns voiced by applicants and other interests who either support or oppose the program. However, the overall effect of regulation upon developers is not included.

The Corps district evaluation presents examples of both typical and problematic actions, concluding with a general summary of the problems and achievements of the district. The evaluation will be illustrated by specific case histories, comments from interviews, and testimony. To the extent practicable, the evaluation also examines the overlaps between 404 and state and local regulatory programs.

CORPS OF ENGINEERS: ALASKA DISTRICT

Overview of Operation

The Alaska Corps District has jurisdiction over wetlands and navigable waterways throughout the state. The majority of wetlands in Alaska are currently without significant development pressure. Most of the Corps permit activities are centered in the Prudhoe-Kuparuk areas of the North Slope (approximately 40%), commercial and residential developments in the Anchorage Bowl, nearby locales, and the Kenai River drainage (approximately 30%), in towns and cities

of southeast and southcentral Alaska, and log transfer facilities in the southeast. (Reeder, pers. comm.) Other planned and proposed mineral developments and oil and gas activities could spur permit activities in the southwest, interior, and northwest regions.

Projects requiring permits are different within each region as are the types of wetland affected. The procedure the Corps follows for each region and activity type varies with the size and significance of the project, with the provisions under general permits, and with wetland planning in the area. (Williamson, Reeder, pers. comm.) Despite the differences in 404 permitting between regions, several general points may be made about the program in Alaska. These will be illustrated in case histories of permit actions.

Permit processing times for non-controversial permits averaged 109 days in 1981, while controversial permits averaged 214 days. (Nunn, 1982) Agency personnel involved in the permit process have cited several factors peculiar to Alaska which cause processing delays. Geographic distances and climatic extremes are major impediments to travel, to meetings among various agencies and applicants, and to efficient mail service. (Nishimoto, Reeder, Eames, Booth, Smith, pers. comm.)

Insufficient resource data is a characteristic problem throughout Alaska. Collected or mapped field data are often insufficient to determine jurisdiction and identify site specific resources during the winter months, especially in relatively isolated locales. Therefore, applications must be held as incomplete and information inadequate until spring weather affords a site visit. (Reeder, pers. comm.) Jurisdiction in Alaska presents particular problems due to the overlap of wetland plant species in upland habitats and the lack of useful indicator plant species for some areas. For example, black spruce occurs both in bog wetlands and in non-wetland uplands along with birch and willow. Tundra plant species may occur both in wet tundra and in non-wetland areas of moist tundra. Certain portions of moist tundra may be considered wetland by the Corps while others are not, based upon hydric soils and hydrology. (Rockwell pers. comm.)

Because of these complexities, the Corps uses the three parameter approach when a question of jurisdiction arises. This approach identifies wetlands by the presence of wetland-adapted plant species, hydric soils and hydrologic characters. Field determinations require the snow-free conditions of summer months. In other wetland types such as tidelands, coastal and freshwater marshes adjacent to waterways, jurisdiction is more easily determined.

The pervasive absence of basic resource data throughout Alaska is cited as a major problem with wetland programs statewide. (Clausen, Reeder, Williamson, Rockwell, Stroebele, Rothe, Pichon, Smith, Thurston, Lawrence, Yanagawa, Nishimoto, pers. comm.) Not only are vegetation maps nonexistent for most areas of the state, wildlife census data and detailed ecological studies on the value of various types of wetlands to fish, waterfowl, game, flood control, and water quality also are relatively rare. These data gaps invariably cause processing delays wherever special studies must be undertaken or completed in order to evaluate a permit action. Monitoring of cumulative and long-term effects of various developments in wetlands is not commonly done. (Yanagawa, Rothe, pers. comm.) Pre-application studies and project planning sometimes alleviate delays caused by data insufficiency. (Nunn, 1982)

Table 4-1 outlines general figures for different aspects of the permit processing procedure. Most applications are executed under Section 404 authority with Section 10 applying in a few cases. Section 10/404 cases occur primarily in the southeast for waterfront facilities and river bank developments on the Kenai River. The determination that a waterway is or is not navigable for Section 10 jurisdiction does not influence the regulation of wetlands along its banks. (Reeder, Rockwell, pers. comm.)

Pre-application sessions are used by approximately 40% of all applicants. Applicants usually request consultations. Arco and Sohio each hold an annual conference with the Corps and other agencies to lay out their plans for the coming year and gain early response on mitigation requirements. These have been generally helpful. (Reeder, Stroebele, pers. comm.) The Corps usually attempts to realign projects out of the wetland areas or identify a less damaging alternative through consultations with applicants and will inform applicants of the likelihood of gaining project approval for ill designed proposals. These are usually withdrawn subsequently.

Public notices, although not always issued within 15 days of a completed application, are usually of sufficient detail to allow for project review by other agencies. (Smith, Nickels, pers. comm.)

Several different images of the Alaska District's role in permit processing have emerged. The District has been criticized for not acting as an arbitrator between the applicant and commentors on the public notice. The District typically informs the applicant by letter of the concerns of reviewers (both public agency and private groups) and suggests that the two parties resolve their differences on their own. (Shanks, Nickels, Smith, Roff, pers. comm.)

TABLE 4-1
PERMIT SUMMARY
ALASKA CORPS DISTRICT

<u>1980-81</u>	<u>1981-82</u>
496 Permits Issued Total	500 Permits Issued Total
18 denied	8 denied
189 permits had pre-application consultation	213 permits had pre-application consultation
6 permit violations	14 permit violations
39 illegal fills reported	47 illegal fills reported
28 after-the-fact permits	48 after-the-fact permits
4 prosecutions	5 prosecutions
13 restorations	8 restorations
	25 withdrawn

Approximately 40% of all permits have special conditions attached.
Approximately 60% of all permits have routine or no conditions attached.
Approximately 40% of all projects are substantially modified during the review process.
1% of issued permits are field checked for compliance by Corps personnel
10% of issued permits are field checked for compliance by other federal agency personnel.

Source: Alaska Corps District, 1982, response to Office of Technology Assessment questionnaire; Reeder, Wolfe, pers. comm.

In more controversial cases, the Corps has acted to negotiate between parties by arranging meetings but has not taken the role of the active decision maker. (Souby, Nickels, Nishimoto, pers. comm.) On the other hand, the Alaska District has resolved some relatively controversial permit cases and recurring regional problems through the application of general permits and wetland plans. The District has also assisted local coastal governments in obtaining general permits where Corps requirements were addressed through wetland planning. The wetland plans of the City of Anchorage and Sitka are good examples of this cooperative effort among local, state, and federal authorities. The state has encouraged this approach rather than the plan-by-permit result created through case-by-case analysis. (Souby, Walsh, pers. comm.)

Mitigations and stipulations on permits take several forms. Approximately 40% of all permits receive special stipulations as a condition of approval. Mitigation and permit conditioning is a subject of concern on some projects; the problem is discussed in detail in the case histories. Generally mitigation in the form of wetland restoration or dedication in return for wetland development is not a common permit condition. Redesign and realignment of a project and seasonal restrictions on activity to minimize impact on wetlands and wildlife are the most common types of permit conditioning. Since it is impossible to apply the water-oriented project criterion to most permit applications in Alaska, EPA, NMFS and FWS function largely outside these national guidelines. This situation has on occasion caused a rather unbalanced review of permits especially in regard to mitigation. For example, one project will be approved by the agencies while an adjacent similar project will not, on the grounds of unmitigable impacts. (Smith, pers. comm.)

Several agencies have complained that the Corps does not always include all the conditions they request be attached to permits and these are then issued without proper notice to the agencies. (Pichon, Nickels, Smith, Clausen, pers. comm.) The Corps, however, doesn't consider all stipulations to be under the authority of the 404 program and consequently necessary to include. (Reeder, pers. comm.) Off-site mitigation is currently the subject of a controversy between the Corps and the Fish and Wildlife Service, both in Alaska and Washington (see City of Homer, p. 4-35).

Permit denials have decreased from 6% in 1980 to 2% in 1981 and an estimated .5-1% in 1982. Elevation of permit decisions as outlined in the memoranda of agreement have been few; USFWS is usually the agency that requests such action.

Enforcement of the 404 program in Alaska is a major problem. Lack of staff and budget to perform regular surveillance or complete aerial flyovers in those areas of greatest development has eroded the overall effectiveness of the program. Most violations are reported by other agencies such as Alaska Department of Fish and Game and Fish and Wildlife Service, whose field personnel may observe violations in the course of conducting their other activities. Once cases are reported, the Corps normally issues a cease and desist order; these sometimes follow reports by many months, however. (USFWS, 1981) In most cases the Corps will evaluate whether under normal processing procedures, they would have granted a permit or not. (Reeder, pers. comm.) The Corps usually issues an after-the-fact permit which may or may not be conditioned. Restoration or removal of fill is occasionally required.

A FWS memo documented over 67 unauthorized fills reported during the 1979-81 time period and 23 cases pending from previous reports. Although most of these cases had received cease and desist orders, the limited enforcement authority of the Corps through legal avenues made little impression on many violators. One developer in Juneau continued to fill wetlands without a permit after having received four cease and desist orders.

Both the FWS and the State Department of Environmental Conservation have tried to support the Corps' enforcement efforts by launching publicity campaigns about the program. However, these efforts are hampered by the lack of funds for surveillance and reluctance on the part of the U.S. Attorney's office to prosecute 404 violation cases.

CHANGES IN THE ALASKA DISTRICT'S PROGRAM

A number of significant changes have occurred in the Alaska District's 404 program since 1977. These are summarized in Table 4-4. Some of the more important revisions are discussed below.

Many observers have stated that the Alaska District is several years behind many other districts in maturity of the program (Huffman, Eames, Lawrence, Fowler, pers. comm.) This conclusion rests largely on the acceptance of the program in the state, definitive jurisdictional limits, and the lack of data on wetlands. However, the District, in cooperation with other agencies, has taken many steps to improve and streamline the program. For instance, permit processing times have decreased from an average 150

TABLE 4-4

CHANGES IN THE 404 PROGRAM, ALASKA CORPS DISTRICT 1972-1982

Type of Change	Reason for Change	Effect of Change	Remaining Issues of Concern
Extension of regulatory jurisdiction over wet tundra in 1979	Pressure from conservation groups and resource agencies on Corps of Engineers	Significant expansion of 404 program and regulation of deposition of gravel for oil and gas development drilling pads, roads, pipelines	- Applicant resistance to Corps jurisdiction over wet tundra
Revision of wetland determination to include black spruce as an indicator species	Improved recognition of wetland characteristics in Alaska	Increased area of jurisdiction	- Debate over relative value of wetlands of this type
Release by several agencies (FWS, Corps, DEC) of public information pamphlets about the 404 program and its requirements	Need to inform public	Unknown	- Continued need for public awareness of program to reduce number of illegal fills
Cooperated with DEC in completion of permit manual for assisting applicant in completing Corps application	Need for applicant assistance, state willingness to provide this service	Beneficial to first time applicants	- Need for continued publicity about the program
Corps taught classes on wetland regulation for other state and federal agencies, industry, and conservation groups	Need for cooperative understanding of program between personnel in different agencies and groups	Beneficial	- Continuing need for classes

TABLE 4-4 (continued)

Type of Change	Reason for Change	Effect of Change	Remaining Issues of Concern
Release of state 401 certification and consistency determination public notices with Corps notice	Stream lining and coordination of state and federal regulatory processes	Beneficial, an approximate 30-day review period eliminated due to joint noticing	---
Increased efficiency in Corps processing, greater coordination between agencies, increased Corps regulatory staff.	Applicant complaints, need for shorter processing times	Improved permit processing time.	- Longer 404 permit processing in Alaska (average 110-113 days) than national average (70-75 days average)
Reorganization of Corps regulatory and environmental branches into separate entities. Division of regulatory functions into three departments: regulatory, environmental review, and compliance	Need for more efficient organization in permit and environmental review to reduce processing times.	Beneficial, regulatory functions now has own environmental staff for routine reviews. Larger projects involving EIS, EA's go to environmental branch of the District	- Still a great need for more staff. Corps wishes to open field offices in Juneau and Fairbanks and increase surveillance and enforcement staff
Formation of Alaska Task Force, an inter-agency and industry group to assure cooperation and communication between those groups interested in wetland issues. Task force suggested by Corps and DEC	Need for cooperation between agencies, businesses, and citizens	Preparation of wetlands slide show, wetlands exhibit, and other public information activities. Provides a forum general exchange of information and ideas	---

TABLE 4-4 (continued)

Type of Change	Reason for Change	Effect of Change	Remaining Issues of Concern
Issuance of three general permits for some development activities on the North Slope	Need to streamline permitting procedures	Fairly effective in reducing review time for minor projects; however, many development projects do not fit specifications of general permit and must obtain individual permit	- Debate over usefulness of general permit
Issuance of general permits to local government in response to completion of comprehensive wetlands plans for jurisdiction	Facilitate local government control and limit federal involvement and overlapping jurisdiction	Facilitation of development and conservation in wetland areas	- Need for widespread planning and permitting of this type
State of Alaska did not issue a 401 certification for particular nationwide permits contained in new Corps regulations	State did not approve regulation of these areas or activities under nationwide permit authority	Corps and State of Alaska presently working out special conditions for some nationwide permits and requirements for separate state 401 certification for others	- Cumulative effects of authorizing fill activities in certain areas - Cumulative effects of not regulating activities in certain areas

days to 110-113 days, (EPA,1982) and state agencies now release public notices simultaneous with the Corps public notice to reduce delays. The Alaska District has increased it's regulatory staff in the past year and hopes to open branch offices in Juneau and Fairbanks.

The Corps, in cooperation with DEC, has founded the Alaska Task Force, a major step forward for wetland planning and regulation. The Task Force has members from most state and federal agencies involved in wetlands and acts to cooperatively explore various wetland regulatory issues. In addition the Alaska District has taken an increasingly greater role in assisting local governments in wetlands planning.

The Alaska District program has matured in certain types of permit processing and is largely untested for others. The North Slope developments are receiving smoother processing now than in previous years. The District is attempting to increase its use of general permits for oil and gas development in this region. (See Section 4 - DNR oil and gas regulatory program.) The District has advanced in urban development and wetland planning for cities such as Anchorage and Sitka. For large proposed mining projects, the Alaska District has still to develop a permit processing and planning model.

The most recent change in the Corps program was prompted by the new interim regulations. The State of Alaska, although not responding within the specified time period, did withhold 401 certification for several of the nationwide permits. This state action reflects a concern over the cumulative effect the nationwide permit could have on Alaskan wetlands and wildlife by allowing many small fills in many areas. However the Corps does not consider the state's action legally binding and all the nationwide permits continue to apply in Alaska. Nevertheless, the Alaska District wishes to retain its working relationship with the state and is working out some compromise measures. These will take two forms depending upon the nationwide permit involved: 1) the Corps will require separate state 401 certification by any applicant authorized under a nationwide permit for certain activities. The state may then evaluate these actions only on the basis of water quality issues not a broad based evaluation of impacts; 2) The Corps is developing regional conditions for some of the nationwide permits. These include restrictions on fill activities in order to avoid fish spawning or wildlife migration times. The Corps has determined that the nationwide permits will not affect the North Slope. The majority of wet tundra is considered contiguous wetlands, not isolated wetlands, and therefore will continue to be covered by individual or general permit. (Reeder,pers. comm.)

ISSUES OF CONCERN

There is one characteristic of the Corps 404 program and wetland regulation in the State of Alaska upon which all sides agree: it is controversial. Beyond this consensus the concerns of applicants, government agencies, native and subsistence inhabitants, fishermen, developers, miners, conservation groups and the general public reveal a wide array of issues. The following discussion paraphrases objections and support for the program from various interests. These have been expressed in interviews and in testimony given in Anchorage during Senator Frank Murkowski's hearings on wetland issues in Alaska (July 1982).

Development Interests

Angie Dugick, Quadrant Development Company Anchorage

"I have been involved in real estate development in Anchorage for the past seven years and in the wetlands process for the past year and one-half. Quadrant has applied for and received six wetlands permits and has several currently being processed.

"Quadrant is very supportive of the wetlands planning which has been in process in Anchorage for the past two years. The general permit for Anchorage that will soon be issued by the Corps of Engineers is a goal towards which an extremely diverse and dedicated group has been working for a long time. The development of the Anchorage Wetlands Management Plan is the first time such diverse interests and viewpoints have come together and worked out a viable solution. Some of the more traditional, conservative developers fought the wetlands plan. They still feel that the federal law takes away their private property rights without compensation. It was very difficult to explain to Quadrant management why the company was siding with the state and federal resource agencies, environmental and other public interest groups against a portion of the development community. On the surface, it was an unholy alliance. However, all these diverse interests were working towards common goals - to preserve critical wetlands while not unduly impeding the development process and private property rights, and to lay the framework for future decisions regarding wetlands in Anchorage. An understanding was developed by the agencies of property owners' and developers' concerns and problems, and developers began to understand that wetlands do have values - that they are not merely construction and permit problems that need to be overcome. (Our) experiences while working on the plan were very positive and provided the basis for ongoing cooperation with all parties involved."

Paula Easely, Resource Development Council, Anchorage

"The Council recognizes the importance and value in preservation of some wetlands but maintains that the current presumption in favor of recognizing all wetlands to be valuable removes conservation efforts from the realm of common sense.

"The Council has recommended that zoning classifications of "preservation" or "conservation" as they relate to private property allow for adequate compensation by the zoning authority. Private land left in the "preservation" classification allowing for no development should not be taxed. We have also urged that wetland mapping programs adopt consistent terminology as well as definitions that reduce the ambiguity and unfettered discretion which is symptomatic of the current program."

Darlene Ruiz, Pacific Legal Foundation

"The wetlands review by the Corps starts with the presumption that "wetlands are vital areas that constitute a productive and valuable public resource, the unnecessary alteration and destruction of which should be discouraged as contrary to the public interest". 33C.F.R. 320.4(b)(1)

"The burden of overcoming the presumption is on the property owner who can overcome the presumption only if "clearly demonstrated otherwise". 40CF.R. 230.10(1981)

"The presumption in favor of the importance of wetlands must be eliminated, with greater emphasis being given to property rights of the individual. The applicant must be permitted an opportunity to fully challenge the conclusions of the objecting agency. There must be some provision for awarding of costs if an agency is found to have objected to a project without adequate foundation or documentation of its conclusions. Mere assertions that a project might endanger ecosystems would be deemed insufficient."

Alaska Miners Association

"Miners have not yet experienced the considerable adverse effects of the 404 program that others have. This is due primarily to the fact that there have been relatively few major mining operations commenced since the 404 program began . . . and miners do not want to be faced with trying to obtain this type of permit with the regulatory process that currently exists.

"After study of the overall effect of the 404 program, the following problem areas must be addressed: 1) full scale, individual 404 permits are required for operations or activities without regard to the actual potential adverse impact on the affected water body; 2) full permit processing, with its commensurate expensive delays, is required even when mitigation measures are agreed upon early in the process; 3) general permits are not utilized properly or to the extent possible to reflect Congress' intent of simplifying the overall permit program; 4) the Corps of Engineers' jurisdiction over tundra is unnecessarily broad and does not reflect biologic realities; 5) the 404 program frequently forces duplication of effort required by existing state laws; 6) Congress has not provided all reviewing agencies with guidance for developing permit stipulations. This can result in the imposition of stipulations that may not be reasonable, necessary, or germane to the purposes of the Clean Water Act; 7) reviewing agencies are not required to provide written justification of permit stipulations; 8) multiple layers of review and a lack of review deadlines result in considerable delay, contrary to the intent of Congress as stated in Section 404; 9) provisions for state assumption of the program are far too burdensome and have thoroughly discouraged states from seeking delegation."

Alaska Federation of Natives, Anchorage

This organization acts as a representative of the native regional and village corporations in Alaska. However, it's viewpoints are not necessarily shared by all the corporations or natives; differences of opinion are quite common. Generally, the native corporations have not had extensive dealings with wetland regulation. The village corporations often don't have the staff to complete permit procedures for their projects and are not familiar with wetland issues. In addition, under ANSCA, many of the village corporations chose lands in river valleys and wetland areas as these were traditionally the most habitable lands. Regional corporations chose many of the important lands for resource development, trade and commerce. They now feel that they need to clearly know which lands are wetlands and which are not. They feel the Corps program does not provide this information. (Shanks Ehelebe, pers. comm.)

The Native Corporations' land interests are dichotomous. Whereas many members of the native community may support development such as oil and gas and mineral extraction, others wish to preserve subsistence values and wildlife habitat. Wetlands are central to this conflict, and development in these areas has occasionally caused friction between regional and village corporations (e.g. Calista Corp. oil and gas leasing).

Cook Inlet Corporation, in their dealings with the Corps program, felt the Corps needed to act as an arbitrator in negotiating permit stipulations. The majority of native resource development projects are in the planning stages (e.g., Red Dog Mine) and may require permits in the near future.

Oil and Gas Industry

The oil and gas industry represented AOGA (Alaska Oil and Gas Association is a vocal protestor of the 404 program). This industry represents the largest portion of the development sector in Alaska. A great deal of their activities are subject to 404 permit review. Not all 37 member-corporations agree on the best approach for meeting the 404 program's requirements, nor the best way to revise the regulations. Generally though, AOGA speaks for the industry. Differences in response are evident in the individual positions of the larger developers (Sohio and Arco) of Prudhoe Bay and Kuparuk Units on the North Slope.

The following excerpts are from testimony given at the hearings held by Senator Frank Munkowski in July 1982. Our interviews with AOGA members have confirmed the concerns expressed in these statements.

Don Glass, Alaska Oil and Gas Association

"Since the original enactment of Section 404 of the Clean Water Act and since the scope of the act was interpreted to include vast reaches of disassociated wetlands, even including wet tundra, the oil industry has been increasingly concerned with the difficulties encountered in getting permission to conduct its activities.

"The principal problems which have been experienced in the oil industry as Section 404 is administered by the Corps of Engineers and EPA are as follows: First, the geographical area of jurisdiction is inordinately large. It sweeps across enormous areas of the state including isolated wetlands, lakes, intermittent streams, virtually all of the North Slope, and most other areas potentially vital to petroleum activities.

"Second is unreasonable delays occur. Although the statute directs that final action on a permit should be taken within 90 days, considerably longer times are not unusual. More than a year is sometimes lost in awaiting a permit decision. A recent American Petroleum Institute study revealed that in instances in which an EIS is performed in connection with a Section 404 permit, the average time to obtain a permit is almost 2 years.

"Third, unreasonable stipulations are often attached to permits. Federal, state, and local agencies propose permit stipulations which are not only beyond the scope of Section 404, but which are frequently

beyond the regulatory authority of the agencies themselves. The Corps has at times been reluctant to exercise appropriate control over the permitting process, with the result that permit stipulations have effectively limited subsequent operational oil and gas activities.

"Fourth, the Section 404 permit program causes unnecessary duplication and expense. Many of the lands which are the subject of Section 404 jurisdiction are also extensively regulated by other agencies. The duplication of regulation of these lands results in inconsistent decisions, delays, and unnecessary expense.

"We believe the legislative history of Section 404 offers little to suggest that Congress intended application of Section 404 controls so broadly as to include wet tundra areas as currently implemented in Alaska. Accordingly, we recommend Section 404 be amended to narrow the geographic scope of the program in Alaska to waters which traditionally have been considered navigable under the Rivers and Harbors Act of 1899."

Roger Herrera, Sohio Alaska Petroleum Co.

"My fundamental argument in joining the ranks in opposition to parts at least of the Section 404 discussion, is an historical remark which suggests that Prudhoe Bay was constructed and planned before the onset of Section 404 regulations. It in fact, was designed and put together with very little oversight of the statutory regulatory, or stipulatory. And it stands on its own record as an excellent example of how a joint oil field should have been planned, with due protection to the environment.

"Since the onset of Section 404 the activities which have taken place in Prudhoe Bay have in fact, been planned and constructed in exactly the same format as they were originally.

"The examples which were formulated to improve the process, namely the general permits, have turned out to be no connoisseur to the oil industry, at least on the North Slope. We are finding that those permits are so narrow as to be inapplicable in 99 cases out of 100. Everything we do out there is perceived to be controversial, therefore, not covered by a general permit. Even when a simplistic operation, apparently within the guidelines of the permit is proposed, we do find that we have to go to all the commenting agencies before we ever submit the permit. If one of those, for any reason, either within its jurisdiction or outside, objects to that general permit, we then have to go through the time using process of normal permitting procedures."

Tim Derigo, Arco Alaska

"Arco Alaska's experience with the Section 404 program has shown that the jurisdiction of the Corps over the tundra is unnecessarily broad. With respect to oil and gas activity, existing state law and permitting procedures provide ample protection for the tundra. The Corps' ability to effectively mediate disputes between an applicant and reviewing agencies is limited. The lack of specifics in the Clean Water Act and implementing regulations allow imposition of permit conditions that are neither germane nor cost effective. The multiple layers of review provided by the present Section 404 permit system embody redundancy and overlap and promote delay in permit processing. The lack of binding deadlines in the statute also leads to unnecessary delay. Last, the current Alaska general permits have provided little real regulatory relief to date.

"We recommend that Congress give states more authority over their wetland resources. For those areas for which the Corps retains authority for the issuance of permits and the determination of appropriate conditions. And that the other involved agencies serve only in the capacity of advisors to the Corps; 2) require the Corps to establish cost effectiveness as a principal criteria in evaluating alternative permit stipulations. If a more costly condition is imposed, the Corps should be required to justify that decision; 3) require the Corps and reviewing agencies to demonstrate that any suggested permit stipulations are directly related to the water quality purposes of Section 404 and other primary and environmental effects of a project as a result of a change in water quality; 4) strengthen the general permit provisions to require rather than merely allow the use of general permits."

Conservation/Resource Dependent Interests

Cliff Eames, National Wildlife Federation, Anchorage

"Probably the most visible role that wetlands play is in providing essential habitat for fish and wildlife. Thirteen million ducks, geese, and swans migrate to Alaska in the summertime and use wetlands as resting, breeding and nesting areas. These waterfowl create hunting opportunities not just in Alaska but nationwide as well. In 1980, 5.3 million hunters spent \$658 million dollars in pursuit of migratory waterfowl nationwide.

"Wetlands also provide food, cover, spawning grounds, and nursery areas for salmon, trout, char, whitefish and many other species of fish. The Kenai River system, for example, contributes as much as 35% of the

total salmon population of Cook Inlet, and accounts for millions of dollars worth of salmon for the commercial fishery and many thousands of angler-days of recreational fishing. Nationwide, the wetland-dependent commercial fish harvest is valued at nearly \$12 billion; in 1980 recreational fishermen spent roughly \$13 billion on fishing activities directed toward wetland-associated species.

"Many other species are also dependent on wetlands during a portion of their life cycle. These include moose, caribou, bear, bald eagles, beaver, song birds, and hundreds of other species, both game and non-game. In 1975, resident Alaskans spent nearly 13 million man-days enjoying wildlife-related recreational activities. Sportsmen alone spent almost \$146 million dollars in hunting and fishing-related expenditures.

"Probably the most frequent criticism of the Section 404 program is that it takes too long to get a permit. (We) support the most efficient processing of permit applications under Section 404 and the elimination of unnecessary regulatory requirements, consistent with the protection of the nation's waters . . . but there are some very good reasons why it should take longer on the average to process permits in Alaska. The vastness of the state and our sometimes less than benign weather increase the time it takes to perform the on-site reviews that can be essential prerequisites to fair and reasonable decisions. Some reviews aren't possible except during the summer. Additionally, Alaska lacks the resource baseline data that is frequently available elsewhere, so that necessary studies are more apt to hold up decisions. Additional funding for wetland inventories and other baseline research would help solve this latter problem. Finally, (I suspect that) most people would agree that additional funding and manpower for all of the reviewing agencies' regulatory components could not help but bring permitting times down."

Ron Lautaret, Sierra Club, Alaska Chapter

"The Alaska Chapter, Sierra Club supports Section 404 of the Clean Water Act as presently written. We believe the program has worked successfully in Alaska by allowing development to proceed while protecting valuable wetland habitat. We urge reauthorization of the Clean Water Act without any change to Section 404.

"Much discussion has taken place over the Corps' definition of wetlands. We support the present definition. If the surface feature is wet, with plants rooted in saturated soil, regardless of whether or not it overlays an impermeable surface such as permafrost, it is a

wetland. Congress intended to regulate such wetlands under Section 404. We are not aware of any scientific evidence contrary to the Corps' definition of wetlands.

"Another important misconception which needs to be dispelled is that Section 404 prevents building or discharge into wetlands. The Corps of Engineers' records show that the overwhelming majority of permits, 98½ percent, requested in Alaska in 1981 were granted. If this trend continues, most of Alaska wetlands available for development will be used for construction rather than preservation.

"Finally, the Sierra Club is very concerned with the lack of surveillance and enforcement by the Corps of Engineers and other resource agencies after permits are issued. For a variety of reasons, probably due mainly to a lack of adequate staff, once a permit is issued, it is a rare occasion when any agency does a followup field examination. Additionally, even when violations are discovered, there is rarely a fine assessed or other reprimand given."

Roger Painter, United Fishermen of Alaska, Juneau

This group is a statewide umbrella organization for the many smaller fishermen's groups. The group actively supports the 404 program and favors permit review by a number of wildlife agencies. Despite the increased bureaucracy they feel that multiple reviews protect fishery interests and essential salmon wetland habitats. They oppose developments in wetlands and adjacent logging and mining which may degrade creeks and important fishery areas. The effects of such operations can be reduced, they feel, through adequate permit reviews and enforcement of mitigation measures such as settling ponds for placer mining activities. The group points to the relatively uncontrolled logging and mining in the southeast during the 1950's and 60's and its destructive effects on small tributary channels, the spawning habitat of Coho salmon. Fishing is a multi-million dollar industry in Alaska. Wetlands are crucial to salmon spawning and the fishermen favor preservation of this habitat through both state and federal regulatory processes.

Individuals

Chester Cone, Kenai River

"I would state that the permit process can never work under existing rules and regulations and must be drastically modified. I would make the following recommendations for change to a more workable process: 1) first of all there must be a consensus of opinion from all agencies as to what constitutes a "wetlands" and all concerned abide by one set of rules; 2) secondly the time frame for review must be adhered to

strictly and no agency should be allowed to extend or delay the application; 3) a determination should be made as to who will have final jurisdiction, and in an instance should any one agency have veto power over the final review agency, which is now the Corps; 4) whoever is the final compliance or regulation agency must unilaterally apply the ruling to everyone equally and not single out a few for scapegoats and ignore hundreds of so-called violators.

"Finally, should the administrative agency determine that privately owned property is more important to the government as a preserve or whatever, then the government should be prepared to buy the land at fair market price and recompense the owner for all loss of time and funds expended to the time of condemnation."

Don Benson, Palmer

"The Corps continues to tell me that my project is not in the public interest. Yet I have a petition that has been circulated only three weeks with over 275 signatures of Alaska residents (from our area) who support our project.

"I feel that the denial of citizens to develop their private property should be stopped. I'm sure if need be I can produce over 500 signatures of residents from our area that support the project. This proves that the permit process is based on the feelings only of the government agencies involved and not on the real public interest expressed by the citizens."

Local Government

Don Gillman, Alaska State Senator, former mayor, Kenai Peninsula Borough

"We have in the private sector, a lot of land that is now -- and this isn't just true in the Kenai, this is statewide -- private sector of the land is classified as wetland if you use one of the seven different types that are purported to be out there. Local land use and zoning is a local issue and local responsibility. It appears that we may be in a situation where the use of permits actually is determining land management and has become one of the major land management tools, which is not being done at the local level except for two or three instances.

"Taxation then becomes another issue. We had many people that were denied permits along the Kenai River. They came to the Board of Equalization and said, OK, I can't do anything with my land. Are you going to tax me on it? At least in that case, our assembly took the position that they could defend in court if they had to, the idea that if there were permits that had been denied, they would put a zero assessment on that land as far as taxing."

Bruce Phelps, Municipality of Anchorage

"The primary benefits of this wetlands plan are it provides a model for other areas of the state and a balanced approach and resolution to a resource problem. Approximately 90 percent of all the private lands that are wetlands have been identified in the wetlands plan for development. However, a large portion of those other wetland areas that are owned by the government, either federal, state, or local, have been identified for protection.

"Second, in terms of benefits, the plan is areawide in approach. Third, it provides predictability and local input into the Section 404 permit process. Without a plan, it is very difficult to reach consensus between the various resource agencies, the developing interests, and the municipality. With the plan, there is a consensus as to what should be done on a particular parcel of property. When you're processing approximately 10 to 15 permits every two weeks, there is a need for such a document. Fourth, the plan provides integration between the coastal management, water quality management, and comprehensive plans. As you are aware, there is a need, both by local as well as state and federal law to integrate the review process. Finally, the wetlands plan leads to a general permit which will significantly reduce permit processing time and cost to both the private and public sectors."

Eben Hopson, North Slope Borough

"The North Slope is an extensive nesting, breeding, and summer habitat for hundreds of thousands of migratory birds from the lower 48 states. These wildlife populations are important to the continued subsistence lifestyle of the Native community. Plants growing in the wetland areas are utilized as a prime food source by caribou, a major subsistence species for our people. This is why the wetland areas along the North Slope are a matter of local concern.

"The North Slope Borough is generally satisfied with its legal consultation and involvement that currently takes place. It is our view that the Corps of Engineers have made good faith effort to use the Section 404 permit program as a mechanism for bringing together the various interested parties to review significant proposed development activities.

"We are aware that the borough has more wetland than the majority of this state, and we have to insure that they are accorded adequate protection. The problem is just with the procedures. Change them, not the basic protections afforded by Section 404."

INFORMATION SOURCES

APPENDIX A

CASE STUDIES

Arctic Region

The Corps, in 1979, announced in a public notice its intention to regulate dredged and fill activities in tundra in Alaska including the Arctic Region. This extension of authority came after a good deal of pressure from resource agencies and conservation groups to force the Corps to recognize tundra as wetlands. (Pichon, pers. comm.) In January, 1979, the District Engineer issued a special public notice which stated the Corps did have jurisdiction over wetlands of the wet tundra type. In March, 1979, the Corps issued two general permits to facilitate permitting for the 1979 construction season (October through December). These two general permits authorized: 1) placement of fill for construction pads and the expansion of existing pads (all pads were limited to 40 acres in size); 2) placement of fill for construction of access roads and extension of existing roads (roads were limited to five miles in length and a crown width of 30 feet). The major condition of these general permits was a requirements for a letter of authorization from the Corps. Eighty letters of authorization were issued. After December, 1979, the Corps required individual permits for all fill activities in wet tundra.

The Alaska District also determined in 1979 that moist tundra also may be considered wetlands under the three parameter approach. (Nunn, 1982) The Corps usually does not perform on-site wetland determinations since studies have shown 80-95% of all moist tundra to be wetland. A field check is generally not required unless the applicant can elicit evidence of non-wetland conditions. In addition, wet tundra and moist tundra are often interspersed in a patchwork distribution; most developments would affect both vegetation types and the Corps treats the entire site as wetland. (Reeder, pers. comm.)

In October, 1981, the Corps issued three new general permits which are currently in effect. These cover construction or expansion of roads less than five miles in length, construction and expansion of drilling pads and pipelines in wet tundra areas. However, the applicant must obtain a letter of authorization from the Corps for each project and adhere to a number of general and specific conditions. The Corps issues a letter of authorization for a North Slope project after comparing the project's parameters with the requirements of the general permit (GP) and determining the project to be within the bounds of the GP. (Reeder, pers. comm.) The general conditions outline overall requirements of the project (e.g., no destruction of endangered species, minimal environmental impact). The special conditions are listed in Table 4-2 for each category of activity. These special conditions were formulated by the resource agencies and the Corps and generally do not overlap with conditions of state lease sales and plans of operation. They are designed to minimize impacts on wetlands, wildlife, and water quality.

TABLE 4-2

NORTH SLOPE GENERAL PERMITS AND SPECIAL CONDITIONS

Permit 81-I

Authorizes the discharge of dredged or fill material for the expansion of existing storage pads, drilling pads, general use pads, and access roads in conjunction with oil, gas, and related support facilities in wet tundra areas on the North Slope of Alaska.

Permit 81-II

Authorizes the discharge of dredged or fill material for the construction of drilling pads, storage pads, and general use pads in conjunction with oil, gas, and related support facilities on wet tundra areas on the North Slope of Alaska.

Permit 81-III

Authorizes discharge of dredged or fill materials for the construction of access roads in conjunction with oil, gas, and related support facilities across wet tundra in the North Slope of Alaska.

Special Conditions

1. That a minimum distance of 100 feet shall be maintained between the toe of storage pads, drilling pads, and gravel use pads and any adjacent lake or stream bank. I, II, III*
2. That drainage structures shall be installed and maintained that are adequate to maintain natural surface drainage and fish passage. I, II, III
3. That reserve pits, flare pits, and relief pits shall be rendered impermeable by a design of the applicant's choice. Permafrost alone is not a sufficient barrier. I, II
4. That fuel pits shall be designed to hold 110% of the maximum anticipated volume of stored fuel and shall be lined with an impermeable membrane. I, II
5. That any pipelines constructed using the fill as a pad shall have a minimum surface to pipe clearance of five feet at the pipe bent. Except that new pipes, adjacent to existing pipes shall be at the same elevation, as the old pipes. All pipes along designated caribou migration corridors shall have a minimum surface to pipe clearance of seven feet at the pipe bent. I, II, III
6. That hydrocarbons discharged into relief pits, flare pits, or reserve pits shall be removed and properly disposed of as soon as practicable during the winter but before spring breakup and within 72 hours of discovery during periods of thaw. I, II

TABLE 4-2 (continued)

7. That drilling operations shall be completed in accordance with approved operation plans. Requests for extension of drilling and operation dates sited on these plans shall be forwarded to the District Engineer and coordinated with the state and federal resource agencies and the North Slope Borough. I, II
8. That fills shall be designed and constructed so that spilled hydrocarbons flow away from adjacent surface waters. I, II
9. That as-built drawings (including at least a scaled plan view, section views, and quantity [cubic yards] of fill material placed) shall be submitted to the District Engineer within 60 days after the completion of each construction increment. I, II, III
10. That fills shall utilize nonwetland areas and existing pads and roads to the maximum extent practicable. I, II, III
11. That initial cleanup of exploratory sites shall be completed by 15 May and final cleanup by 15 September following every drilling operation. II
12. That, if an exploratory site is not to be used for additional exploratory drilling operations and is not to be converted to a production or injection facility, the site shall be rehabilitated according to a plan approved by the District Engineer. The rehabilitation plan shall incorporate state-of-the-art techniques and shall be submitted to the District Engineer for approval within six months after the decision to abandon the site. The site rehabilitation shall be completed within two years after the decision to abandon the site. II
13. That at the time of application for gravel roads constructed to exploratory drill sites, documentation must be submitted to justify the construction of the access roads. III

* Numbers indicate under which general permit I, II, III the special condition is included.

The requirement that each project receive a letter of authorization from the Corps (which is reviewed by the resource agencies) sets this general permit process apart from many others and closer to a modified individual permit. However, the additional regulatory requirements are associated with the large quantities of fill involved in each project. (Reeder, Stroebele, Booth, Pichon, Anjum, pers. comm.) These activities, of course, are centered in the Prudhoe Bay-Kuparuk oil fields presently. However, oil development in the NPRA may also require 404 permits. (Nunn, 1982)

The usefulness of the general permits in facilitating development is an issue of concern both to the oil companies and regulatory agencies. As expressed in Roger Herrera's testimony (P. 4-60), the general permits do not represent the ultimate use of this regulatory option which the Corps could invoke and reduce permit review and processing times. However, resource agencies, local governments, and the state have applauded the limited review process via letters of authorization. They feel adequate site specific review is possible using the general permits while the longer processing time for individual permits is avoided. (Anjum, Stroebele, Trasky, Booth, Pichon, Souby, pers. comm.)

In review of the Alaska Corps District's program on North Slope permits, authorization letters for activities covered by the general permits averaged 63 days to process. Individual permits in this region averaged 152 days to process. (General Accounting Office, 1982) Overall, the Corps has permitted the filling of 7,200 acres since 1979. This figure does not include all roads and support fills for which no area coverage figures were available. Fill for the Trans-Alaska pipeline is also not included. (Nunn, 1982)

Preapplication conferences are held on a yearly and regular basis between the large oil companies on the North Slope and the Corps and resource agencies. The yearly conference involves a general overview of areas where the companies expect to place facilities in the coming season based upon their exploratory information and preliminary engineering design. (Arco, 1983) A circle map indicating facility siting areas is produced. From this map the state and federal resource agencies can complete field work on these areas and determine the significance of the wetland resources present. As the company applies for a 404 permit for each project another conference is held, sometimes jointly with DNR in their plan of operation review. These conferences act as an exchange between the land men of the oil companies and the resource agency personnel to negotiate engineering and economic constraints of oil development with resource concerns. Project plans often change during the permit process in relation to the oil company's engineering design modifications. This dynamic review process can lead to problems; however, particularly when an agency, having negotiated

the loss of one wetland to allow development, is requested to approve the loss of another nearby wetland when engineering dictates a particular road or pipeline routing, or a plan of development changes greatly and the agency feels it must compromise too great an amount of wetland. Conversely, the oil company, in identifying a less costly engineering solution to an oil development project, may contest delays and added expenses of avoiding a wetland area or awaiting agency approval of a permit revision. The continuous revisions in this process compromise the predictability of project siting and wetland resource impact reviews. (Stroebele, Trasky, Huffman, Reeder, pers. comm.)

We shall examine several case histories of oil development activities on the North Slope. One case is routine while the other two were controversial. In addition to processing time delays and added costs, several other aspects of 404 permit processing are strongly contested by the oil and gas industry (see testimony, p. 4-60). Among these are: 1) Corps jurisdiction over wet and moist tundra as wetlands; 2) overlap of the 404 process with DNR state lease sales and plans of operation requirements, state Coastal Zone Management, and local North Slope Borough zoning; and 3) "unjustified" stipulations added by resource agencies to the 404 permit.

On the issue of jurisdiction, it may be argued that wet tundra was not intended by Congress to be regulated as a water of the United States. However, there does not appear to be any evidence that wet tundra does not constitute a wetland under the Corps definition and should be treated differently from swamps, bogs, and marshes of other vegetative cover types.

The Corps stated their position of this matter:

"Whether an area is typified by the vegetation community - wet tundra or the vegetation community - moist tundra does neither establish whether the area is wetlands nor does it establish the Corps' regulatory jurisdiction over the area. It is the determination of whether an area fits the definition of wetlands and where the wetlands are located that are the concerns of the Corps.

"The tundra biome is commonly connected with wet soil conditions; in fact, in Alaska our experience has shown that almost always the two vegetation communities, wet and moist tundra, are in fact wetlands. The tundra biome is indicative of wetlands, however, you cannot equate tundra with wetlands. Areas of Alaska are identified as the tundra biome. Even greater areas are the association type - wetlands. In identifying the areal extent of the wetlands under the regulatory jurisdiction of the Corps, in Alaska we do not use the tundra biome as

a criterion. While the vegetation communities, wet and moist tundra, tend to indicate whether an area is likely to be wetlands, they are not used as the only criterion for determining a wetlands. We identify wetlands using a multiple-parameter approach that factors together the soils, hydrology, and prevalent vegetation type in determining whether an area is or is not a wetlands." (Nunn, 1982)

The views of AOGA and several of the oil companies on this issue are expressed in testimony (p. 4-59 to 4-61).

The issues of permit stipulations and regulatory overlap will be examined in the following cases. Information for each case is derived primarily from the permit files of the Alaska Corps District, interviews with Corps and agency personnel, and Arco responses to the draft report.

Oliktok Dock

This project was covered under an individual permit and involved placement of 300,000 cubic yards of gravel to construct a 6.15-mile long access road, 50,000 cubic yards of gravel to construct a vehicle staging area, and 150,000 cubic yards of gravel to construct a dock extending from Oliktok Point. Overall, the project would fill 42 acres of wetland (wet tundra) and 42 acres of marine bottom. The facilities would provide a module off-loading dock for development of the Kuparuk oil field. The application from ARCO Alaska was submitted to the Corps on October 9, 1981, and a public notice released October 21, 1981. The applicant had a consultant complete studies of the Oliktok Point area and characterize its biotic and physical resources. This study became the basis for the Corps environmental review. The Corps extended the permit review period in order to accommodate these studies submitted by the applicant.

The FWS who had been negotiating with ARCO, preferred another alignment for the road which would have crossed Air Force property and been more removed from the coastal marshland. EPA echoed the FWS concern in their response. However, the Air Force denied ARCO an easement and the FWS approved the coastal alignment. They suggested three stipulations be attached to the permit which was issued in March, 1982. These included:

1. That drainage structures shall be installed and maintained to allow natural drainage along the access road, including inundation of the coastal salt marsh by storm surges.
2. That the applicant shall participate in an inspection of the project in June, following break-up, to identify problem areas prior to major impacts on the vegetation.
3. That the channel into the lagoon at Oliktok Point shall be maintained to allow natural flow into and out of the lagoon.

No other agency objected to the permit and the state completed a 401 certification and coastal consistency determination. The North Slope Borough under authority of their zoning ordinance approved the project issuing a permit with the following stipulations in March, 1982.

1. That traditional subsistence activities, including hunting, shall be allowed to continue.
2. That the dock facilities shall be made available to local interests via prior arrangement with ARCO.
3. That traffic, during critical caribou periods, to and from the dock, shall be minimized to the maximum extent, including prohibition. Road closures shall be coordinated by ADFG or the North Slope Borough.
4. That ARCO shall send this office copies of all state and federal permits and stipulations realizing that these are an integral part of this permit.
5. That the facilities shall be open for inspection by the Administrator or his authorized representative on 48-hours' notice to the contact person designated in the application for this permit unless otherwise requested by the applicant and agreed to by the Administrator. The purpose of this inspection is to insure compliance with permit stipulations.

On February 26, 1982, DNR issued the State plan of operations permit also requested by the applicant in October 1981. The plan of operations only covered the access road since the dock was not constructed on state-leased land. A separate tidelands lease, also issued by DNR, was required. The plan of operations included the following conditions required by DMEM:

1. That portion of the access road along the Oliktok Point Lagoon is constructed such that salt water influence to the lagoon is not obstructed.
2. The access road is adequately culverted to maintain surface drainage patterns.
3. Deposition of gravel and other major activity shall cease during the periods May 15 through June 20 and July 7 through August 5.
4. A completion report must be filed with this office within fifteen (15) days upon completion of these operations.

The Division of Land and Water Management of DNR required the following stipulations also:

1. Vehicles shall be operated in a manner such that the vegetative mat of the tundra is not disturbed and blading, or removal of tundra or vegetative cover is prohibited except as approved by the Director of the Division of Land and Water Management or his designee.
2. Winter on-tundra travel may begin when adequate snow cover and frost depth conditions exist for the activities intended as determined by an authorized field representative of the Division of Land and Water Management. Certain on-tundra activities may begin sooner than others, depending on the impact or magnitude of the operations.
3. Winter on-tundra travel shall be terminated prior to spring breakup of each year, or anytime after April 15, upon 72-hour notice by the Director of the Division of Minerals and Energy Management.
4. Summer on-tundra travel shall require specific approval from an authorized field representative of the Division of Land and Water Management and shall be limited to vehicle types approved by this Division.
5. Throughout its length, the road shall contain adequate culverting to permit and maintain natural surface drainage patterns and prevent ponding. That portion of the road which will be subject to storm surges must contain culverting adequate to reflect this environment.
6. The approved gravel source for this road is Kuparuk Mine Site "D". (pending approval)
7. The Director of the Division of Land and Water Management may require that his authorized representative be on-site during any operations conducted under this permit.
8. A completion report shall be submitted within fifteen (15) days upon termination of permit activities. This report shall contain the following information:
 - A. Actual routes of travel depicted on a USGS-type map.
 - B. A list of vehicles used for any off-road travel which may have taken place.
 - C. Statement of clean-up activities.

The conditions in the 404 permit (as requested by FWS) and the North Slope Borough permit do not overlap but, rather, reflect a wetland resource and hydrologic concern of FWS and the subsistence value/local planning concern of the Borough. The stipulations of the plan of operation specify to a greater degree of detail the permitted operation on the project roads as well as overlapping with the conditions required by the 404 permit. (Corps of Engineers, Beaufort Sea 29 file, DNR LO/NS 81-185, Oliktok Point Access Road)

Prudhoe Bay Oil Field Waterflood Project

This case history is complicated and amongst the largest developments on the North Slope which has undergone 404 permitting. The project was the culmination of a 17 month long planning and review effort sponsored by the Corps through preparation of an EIS. Generally the federal resource agencies exhibited a good deal of cooperation, and waterflood was approved in 17 months, a relatively short time frame given the controversial nature and complexity of the project. Another interesting turn of events exhibited by this case is the role of the state consistency determination and the effect of the applicants choice of alternatives on the final outcome of the project. In the following account, we will present a simplified summary of the case which discusses the most pertinent points.

The waterflood project, first proposed in 1979, was necessary in order to boost subsurface pressure in the Prudhoe Bay Oil Field and recover additional oil reserves. Basically, the facility would consist of an offshore seawater intake, pipelines, and seawater treatment plant and seawater outfall and pipelines located at the existing west dock facility at Simpson Lagoon on the shore of Prudhoe Bay. From its onshore terminus, the seawater pipeline would diverge into two segments with one branch serving the east and one the west side of the oil field. Several alternative configurations of the offshore intake and the onshore pipelines were proposed by the applicants, Sohio and Arco. The proposed project was covered under three 404 permits, one for the offshore facilities from Arco and two separate applications for the facilities on either the east (Sohio) or west (Arco) sides of the oil field. However, in most instances the project was reviewed as a whole and the applicants negotiated many issues jointly with the agencies.

The Corps received the applications in August, 1979, released three public notices in October and determined the need for an EIS. The applicants were supportive of this requirement and in November, 1979, a scoping meeting was held with the reviewing agencies, the applicant's consultants, and the Corps. Three alternatives for the water intake facilities were discussed and subsequently addressed in the EIS. These included: 1) a gravel island to support the intake;

2) an underwater intake with buried, underwater pipes; and 3) a 3,700 foot extension of the existing causeway at the west dock. In addition, several alternative alignments of pipelines and roads were proposed for onshore facilities. Most notable amongst these was the several alternative alignments of the road between pad E and pad K on the west side of the field. The applicants proposed only one alignment of the road between the central compressor pad and the west dock on the east side of the field.

The Corps prepared an EIS based largely upon industry consultant reports and completed in cooperation with NMFS, FWS, and EPA. In June, 1980, the Corps published the Draft EIS. Most federal and state agencies and reviewers reacted favorably to the completeness and conciseness of the document. The EIS identified the gravel island intake as the preferred environmental alternative. This preference is attributable to several factors: 1) icing and freezing problems rendered the underwater intake unfeasible; 2) the extended causeway was cited as posing significant adverse effects on the anadromous fishery and marine life of Simpson Lagoon. Although the existing west dock causeway already impeded fish passage, the extended causeway would further block fish passage along the shoreline and transport of sediment. Detrimental water quality and salinity changes in the lagoon were also expected to occur. The state and federal resource agencies approved the gravel island alternative in their responses to the EIS. Local governments, especially concerned about wildlife and fishery impacts, preferred this alternative.

The applicants were adamant that a causeway be built to 1) insure access to the pipes in winter should there be a problem; and 2) provide safe daily transportation for the workers who needed to get to and from the treatment plant, particularly during the stormy autumn and early winter periods (Arco, 1983).

Simultaneous with 404 permit review, EPA was processing NPDES and PSD (prevention of significant deterioration) permits for the discharge of air and water pollutants from the project. Both a state coastal consistency determination and a 401 certification were also being sought by the applicants.

In August, 1980, during the public response period for the EIS, the applicants submitted a revised 404 application and new public notices were released. These changes altered pipeline routes primarily. The Final EIS was published in September, 1980, with the gravel island alternative being preferred by the Corps, resource agencies, and the State of Alaska.

Soon thereafter, the applicants revealed that detailed engineering design had only been completed for their preferred alternative, the causeway extension. Arco had contracted Bechtel Engineering for the design of the waterflood facilities. In May/June 1980, engineering went from the conceptual phase to the detailed design phase. Arco states that Bechtel did not have adequate personnel to complete engineering on both the gravel island and the causeway alternative. If Bechtel had to design for the island and the causeway, a one-year delay would occur due to a delay in the sealifts for the 1984 start-up of construction. Therefore, the applicant, knowledgeable of this situation in June 1980, decided to undertake detailed design engineering on their preferred alternative. (Arco, 1983)

The State of Alaska concluded a one-year time delay in waterflooding of the oil field would result if the causeway alternative was not approved. This delay would lower the ultimate amount of oil recoverable from the field, and, similarly, revenues to the state. An estimated 60 to 70 million barrels of oil, worth nearly one billion dollars, would have been left unrecoverable if the state did not assure that the causeway alternative was permitted despite its environmental hazards. The State Division of Minerals and Energy Management completed this estimate.

The state coastal consistency determination explained the situation: "In the case of waterflood, the applicants have identified that if the proposed causeway extension is found inconsistent with the ACMP (Alaska Coastal Management Program), a likely one-year delay in the start-up time for waterflooding the Prudhoe Bay oil field will result. This delay predicted by the applicants is not the result of the State's failure to identify the environmental impacts on fish migration, sediment transport and salinity in Simpson Lagoon from the proposed extension of the causeway early in the review process. These issues were clearly articulated beginning approximately one year ago. Rather, it is due to: 1) the State's inability to require the applicants to undertake equally detailed design of both the environmentally preferred gravel island alternative and the applicants' preferred causeway extension proposal beyond the conceptual design stage during the environmental impact statement process; and 2) the applicants' determination not to voluntarily design for the State's preferred alternative early in the project's development.

"Even though the State has determined that construction of a gravel island would minimize environmental impacts and would be feasible from an engineering and cost standpoint, the delay involved in requiring that design for the waterflood project would result in loss of oil productivity in the Prudhoe Bay field and subsequent lost revenues to

the State which outweigh the detrimental impacts of an extension of the causeway. In other words, while the State believes that a feasible and environmentally preferred alternative to the applicants' proposal does exist in the gravel island alternative, when weighed against economic considerations important to the State, not to mention the overall national interest in maximizing domestic oil production, the applicants' proposal is unquestionably the most prudent under the ACMP."

The state, through DPDP and DEC, then held a series of meetings to attempt to negotiate approval of the extended causeway alternative. The Corps was likewise instrumental in rectifying the opposition of the federal agencies with the state approval of the project and avoid elevation and further time delays. Eventually through this negotiation process, the agencies reached a compromise whereby the extended causeway would be approved with a number of stipulations and a monitoring program. Arco had offered to complete several of these stipulations and the funding of a monitoring program several months earlier. The federal agencies agreed to these conditions to the permit and added specifications to the monitoring program. Onshore facilities on the east field were approved but on the west field pad K to pad E road was required to follow the A-3 alignment rather than the A-1 alignment which the applicant preferred. The latter would have necessitated filling a large area of wetland of high quality waterfowl habitat. The primary modifications to the 404 permits involved:

- 1) Constructing a 50-foot breach in the causeway to allow for fish movements
- 2) A multiparameter monitoring program financed by the applicants and continued for the lifetime of the project to assess the effects of the causeway on coastal erosion, sedimentation rate and characteristics, water quality, fish migration, and the effects of outfall, screens and bypass systems on marine life.
- 3) Maintain an area of Simpson Lagoon between the causeway and Stump Island from sediment buildup and restriction of fish passage.
- 4) No construction in the active floodplain of the Sagavanirktok River between July 7 and August 5, and no construction in the wetted perimeter of the river between August 1 and October 31.
- 5) Pipelines constructed adjacent to existing pipelines should be at a height of existing structure. New pipelines should be at a five-foot minimum clearance.
- 6) Pipelines across the Kuparuk River should be buried or constructed at a seven-foot minimum clearance.

The Corps issued the permits in January, 1981, 17 months after application filing. This period included not only the preparation of an EIS and articulation of the many issues surrounding waterflood but also a highly volatile period of negotiation over permit approval. DNR issued a plan of operation approval in January 1981 which contained the same conditions as the 404 permit and refers to the Corps EIS in relation to the approved pipeline alignments. The conditions of the DNR plan of operation were formulated in tandem with those of the 404 permit as the EIS process was completed. (Bond, pers. comm.)

The state, through DPDP and DEC, took a central role during the latter portion of the 404 permit processing. Three federal agencies, EPA, NMFS, and FWS, were strongly opposed to approving the causeway alternative, and, through the state and Corps-led negotiations, they were persuaded. (Souby, Wolfe, Stroebele, pers. comm.)

The state voiced a warning over similar choice-by-default situations such as the waterflood project presents. They suggest the need for some overall review of cumulative development plans for the Prudhoe Bay region: "The State of Alaska feels it necessary to indicate that our action in finding the extended causeway to be the prudent alternative should not be considered a precedent for future North Slope development. We are aware of the consideration currently being given to the construction of additional causeways in the Mid-Beaufort Sea region. Further, were one to assume future requirements being similar to present requirements for the development of onshore and offshore arctic oil fields, it is not unreasonable to expect many requests for additional causeways and seawater intakes to develop the oil resources of the arctic coastal plain and continental shelf. Because of the potential cumulative impacts of such development, it is necessary for the state to assess expeditiously future project specific developments not only on an individual basis but also from a cumulative perspective. The joint effort of the state and the Corps in developing future development scenarios will be most helpful in this regard." (Corps of Engineers, Beaufort Sea 20, 21, 23, permit files, Final EIS Prudhoe Bay Waterflood Project, DNR, LO/NS 79-118 Waterflood Project)

Alternative Route A

This proposal is an outgrowth of the waterflood project and was recently the subject of an elevation review. The exploration and development of oil reserves often leaves future facility development unknown until the completion of exploratory drilling and advanced engineering design. This information, derived from highly expensive and privately financed exploratory work, is considered proprietary by its owners, the oil companies. Each company, in competition with

others for lease sale bids, is unwilling to release this information for understandable reasons. The case exemplifies a situation involving proprietary information becoming the deciding factor in a permit action. The practice of limiting release of proprietary development information may cloud the disclosure of benefits and adverse impacts which the Corps' public interest review weighs. In addition, this practice, though quite understandable from the industry's point of view, precludes development of any overall plan for the Prudhoe Bay wetlands and shoreline. Consequently, the state and federal agencies must evaluate each proposal individually and consider the need and justification for wetland fill to build additional roads without adequate knowledge of the overall development plan and projected use of each facility. This situation is a feature particular to the permit process for oil and gas development and requires a different type of planning than other areas of Alaska. (Stroebele, Trasky, Souby, Pichon, Anjum, Eames, pers. comm.) This project was the first example of the elevation process under the new MOA. The Alaska FWS referral was rejected by FWS in Washington.

During the initial scoping sessions for the Waterflood EIS, Arco proposed continued use of the existing west dock road for the waterflood pipelines. The waterflood permits approved use of the existing west dock road and approved another new corridor leading from the central compressor pad (CC pad) to pad E. The federal and state agencies had originally preferred a route from the central compressor pad to pad G, but during the 17 months of waterflood review, process and negotiations, the alternative from the CC pad to E was approved in exchange for particular conditions to the permit. (Stroebele, pers. comm.)

In May, 1981, Arco applied for a new utility corridor, termed Alternative A, which would have led from 3.9 miles from the CC pad to the west dock staging area and have paralleled the existing west dock road. The permit was denied in September, 1981. The reason given by the federal and state agencies and the Corps was unjustified filling of wetlands when a practical alternative route (west dock road) existed and had been identified in the Waterflood EIS. (Corps of Engineers, Putuligayuk River 5 file). Subsequent to this denial, Arco requested an interagency meeting in October, 1981. During this meeting, Arco discussed the reduced operation and maintenance costs associated with the new routing. Detailed engineering design, recently completed, had revealed that \$4 million in capital costs could be saved by constructing a new route. Arco also stated their safety concerns about placing the water and fuel/gas lines for the waterflood treatment plant adjacent to the west dock road, the most heavily traveled road on the North Slope. They had only recently realized these concerns. (Arco, 1983)

In March, 1982, Arco reapplied for a permit for the same utility corridor. The new proposal was slightly shorter and slightly reduced in fill volume with some improved drainage conditions. The project would fill 14 acres of wet tundra. In their application Arco states they intend to consolidate the Eastern Operating Area Waterflood-related utilities within the proposed utility corridor. The anticipated future development of this area of the field is substantial, and efforts will be made to consolidate additional utilities along the proposed corridor. In May, Arco presented the new information to the Corps, state and federal agencies concerning the following potential projects to substantiate need for the project:

1. Proposed North Prudhoe Bay State No. 2 Pad (NPBS #2)
2. Lisburne reservoir test at West Bay State No. 1 Pad.
3. Alaska Northwest Gas conditioning facilities.
4. West dock staging area expansions.
5. Continued use of West Dock and dock road for materials movement at sea lift.
6. Electrical switch gear station for the seawater treatment plant.
7. The waterflood project lines.

However, these were not considered reason for permit approval by the state and federal agencies or DPDP. The state herein cited their justification: "The argument for location of facilities along this proposed corridor, Alternate Route A, remains unsubstantiated. The West Bay State No. 1 Pad (2), the West Dock staging area expansion (4), and the Switch gear station (6), are all planned for, or constructed along, the existing West Dock Spine Road corridor. Consideration of these developments did not favorably contribute to arguments for the Alternate A corridor. The traffic problems associated with the increased material movement along the West Dock Spine Road (5) have been alleviated by the placement of five turnouts. Though we appreciated the intent to incorporate some consideration of potential gas conditioning facilities at this time (3), we found the effort inappropriate within the context of this permit application. Finally, the placement of flowlines serving the potential production from the North Prudhoe Bay State No. 2 Pad (1), and the West Bay State No. 1 Pad (2), as well as the Waterflood seawater lines (7) can be accommodated within the existing West Dock Spine Road corridor." DNR also denied approval of the amendment to the waterflood plan of operation submitted by Arco for the Alternate A project. DNR found the project inconsistent with the standards of the Alaska Coastal Management Program, which require consolidation of energy facilities, avoidance of wetland areas, and use of prudent alternatives to projects with adverse impacts.

FWS also requested denial stating: "The zone of impact along a heavily traveled road, like the West Dock Road, is extensive. Significant differences in nesting densities adjacent to roads have been measured; the zone of impact was hypothesized to be 60 to 200 meters (197 to 656 feet). Dust along the haul road has been measured up to 1 kilometer from the road, although the major impacts on vegetation occur within the first 50 meters. Along an untraveled road, dust has been measured up to 32 meters from the road. The zone of impact along the West Dock Road is estimated, based on the available information, to extend up to 300 feet from either side of the road. Construction of "Alternate A" would further fragment wetlands, cover 14 acres with gravel, potentially inundate 396 acres of wetlands, and alter vegetation adjacent to the gravel pad due to dust deposition, all of which indirectly impact nesting birds. Placement of the pipelines along the West Dock Road reduces the overall impacts by placing the new pipelines in an existing impact zone."

EPA, however, met with the applicant in May and concluded: "Alternatives which follow the West Dock Road alignment are environmentally preferable and feasible. However, EPA will not object to the issuance of this permit. We are now aware of Arco's commitment to minimize traffic, ponding, and dust potentials if this permit is granted." They requested five stipulations to the permit. In June, the state found the project inconsistent and DEC denied 401 certification. FWS as well strongly opposed the permit.

In July, 1982, a meeting of DPDP, directors of the Department of Land and Water Management, Department of Minerals and Energy Management of the Division of Natural Resources, and Department of Environmental Conservation was held with Arco. In their subsequent finding of project consistency, DPDP described the outcome of this meeting: "Arco disclosed new information relating to offshore development. In addition, the Department of Natural Resources separately discussed several likely development scenarios in order to provide background information relevant to this decision. Based upon the review of this new information and the existing project files, we have concluded that the utility corridor requirements necessary to meet the anticipated industrial needs in this area are no longer similar to those originally assessed in the previous review, and cannot be met within the existing West Dock Spine Road corridor. Therefore, we have found the West Dock Spine Road is no longer a feasible and prudent alternative to the Alternative A proposal for long-term consolidation of facilities. The details of this confidential and proprietary information, and, therefore, the balancing rationale and findings supporting our decision, may not be disclosed pursuant to AS 38.05.035 (a)(9)." It should be noted the director of the Department of Fish and Game did not participate in this meeting. (Stroebele, pers. comm.)

In addition, DNR approved the project in July as required under the plan of operation, and included six stipulations. Five of these conditions were also required by DPDP in their consistency determination and placed on the DNR plan of operation from this determination as well.

FWS, however, was not made party to this proprietary information and continued to object to the project. The Corps made its decision to issue the permit and the FWS requested elevation in late July, 1982. Their reasons: "On July 15, 1982, my staff met with you and were given additional information by Arco's representatives on the likelihood of 'Alternate A' serving as a utility corridor for off-shore oil transportation. The applicant stated that this use is a conceptual design that might be initiated two or more years in the future. In the three years since your District asserted Section 404 jurisdiction over wetlands of the North Slope, we have seen numerous siting changes as oil field development proceeded from conceptual to final design. Since the waterflood pipelines are already permitted in previously impacted wetlands, we recommend 'Alternate A' not be constructed."

However, at the Washington level, the Assistant Secretary of the Interior made the decision to forego the elevation process and concede the permit be issued. The Corps approved the permit dated September 20, 1982, six months after the second application and several years after the Waterflood EIS. Four special conditions were attached. These are listed below with the initials of the sponsoring agency.

1. That the low pressure seawater pipeline shall be placed and constructed along Route A in order to ensure that this route can be easily utilized as a utility corridor for future development and for economic transportation of production with offshore and nearby development. DNR, DPDP
2. That culverts shall be installed and maintained as necessary to maintain existing drainage patterns and flow volumes. DEC, DNR, DPDP, EPA
3. That access to the construction pad shall be limited to construction, maintenance, emergency, and inspection vehicles specifically engaged in work on the pad. A gate shall be installed on the construction pad area and kept locked to prevent nonessential use of the corridor or pad. DEC, DNR, DPDP, EPA
4. That construction and routine maintenance of the pad and paralleling pipelines shall be scheduled to avoid the period 1 June through 15 August. Activities which must be scheduled within this period shall require concurrence by the state. DNR, DPDP

EPA had requested two other stipulations in their early approval of the project which the Corps did not include on the permit. The first condition was incorporated into the project and the Corps felt the second condition was inappropriate.

1. The conceptual alignment in the permit application should be adjusted to avoid areas of *Arctophila fulva*, mixed moist and wet habitats within drained lake complexes and other high value habitats. The selected alignment within these high value habitats should also generally parallel the natural drainage pattern to minimize the potential for ponding.
2. The Waterflood monitoring studies of bird use and vegetation should be expanded to include this construction pad and its corridor. The addition of this route to the study program would document the effects of a new pad running generally parallel with the prevailing drainage and with limited traffic, which will be valuable information for future permitting decisions. Since construction has not begun, summer 1982 could provide a suitable baseline monitoring period. A special attempt should be made to monitor this nesting season. (Corps of Engineers, Putuligayuk River 7 File)

The overlap of identical conditions between the DNR plan of operation and the 404 permit (incorporating state concerns from 401 certification and the consistency determination) in this case is derived from the state position being repeated through the two permit processes. In both the original denial and final approval of the project, the coastal consistency determination was the primary directive from the state in the Corps and the DNR process.

Overall, in the opinion of many state and federal agency personnel, the approval of this permit compromised the prior effects of the Corps and agencies, through the two-year waterflood permit process, to consolidate wetland fill for this project. It is their contention that had Alternative A been considered in the waterflood analysis, the state and federal agencies could have reviewed an overall siting plan for waterflood facilities and avoided creating one road through wetlands for the waterflood permit and another through wetlands for the Alternative A permit (Stroebele, Wolfe, Pichon, Trasky, pers. comm.) On the other hand, Arco feels Alternative A was a required amendment to the waterflood project arising from more detailed engineering design and cost savings which they identified after the waterflood permit was issued. (Arco, 1983)

The need for some type of cooperative planning effort for North Slope development seems evident to avoid duplicating prior efforts with new revisions. Due to the sensitivity of exploratory and developmental oil information, the likelihood of an overall facility plan is doubtful. However, a wetland resource plan which prioritized those wetland areas of greatest importance as wildlife habitat and those upon which development could proceed, with the understanding that the location of subsurface resources is not consistent with surface wetland resources, would establish a groundwork for facility siting and lend a degree of predictability to the permit process. Such a plan would allow for greater cumulative review of development. (Huffman, Reeder, Stroebele, Trasky, Bond, Anjum, pers. comm.) In addition, a cooperative planning effort may lead to greater use of general permits between the Corps and DNR and reduce the redundancy of present permit programs. This overlap is discussed in greater detail in a following section.

Up to the present, planning for development on the North Slope has been a consistently controversial issue in Alaska. Several factors are responsible for this situation: 1) resistance on the part of the oil interests to wetland planning in general throughout the state; 2) proprietary and changing nature of oil development information; and 3) the problems encountered by the North Slope Borough to balance conservation of wildlife habitat and subsistence values with the development interests of the state and industry for their coastal management plan. If a plan for the Prudhoe Bay-Kuparuk field wetlands could address these concerns without undo risk to industry secrets, permit processing could advance in a more predictable fashion.

In the three case histories examined here, the mitigative measures take several forms: 1) modification of road and pipeline routes and other facilities to avoid important wetlands; 2) seasonal work restrictions to avoid disruption of particular wildlife activities (e.g., migration, spawning) and decrease amounts of dust from heavy road use; 3) monitoring and other studies; and 4) design of roads, powerlines, and pipelines to facilitate caribou movements, drainage and bird flights. State and federal agency personnel base their permit conditions on research findings which substantiate the importance of particular wetlands to waterfowl or caribou or behavioral responses of wildlife to development. (Cameron, Stroebele, Trasky, pers. comm.) Other research refutes these findings, and, at least in the case of caribou, an uncertainty exists over the impact of development on this species. This uncertainty has led to resentment on the part of the oil companies to often stringent and costly conditions being placed upon permits which they feel are of unknown benefit in reducing effects on caribou. (Derigo, pers. comm., Arco, 1983)

Another question arises over whether the 404 permit is the proper vehicle to address the concerns of facility activity and use, or whether 404 should only regulate the placement, location and amount of gravel fill. The Alaska District has generally taken the stance that 404 is a broad-based program and should address the particular aspects of facility activity listed above. However, the District often deletes conditions requested by agencies because they consider them beyond the bounds of the program (e.g., dust control, snow removal), or covered under a parallel permit (e.g., 401 certification). The district defines particular activities, such as snow removal and disposal, as waste and therefore considers them outside the 404 program. Instead, they feel EPA should regulate this activity under the Section 402 program. (Reeder, Williamson, Wolfe, pers. comm.)

Southcentral Region

York Steel Co. Harbor Facility

This case history illustrates a relatively early (1977) permit action in which NMFS, EPA and FWS strictly applied water-dependent and water-related criteria to projects in Anchorage. It also demonstrates a great deal of negotiating between wildlife agencies and the applicant largely separate from and uninvolved with the Corps. The Corps in this case acted to advise each party of their need to consult with each other but on most occasions did not referee these negotiations. They did, however, facilitate processing by guiding the applicant in his dealings with agencies and providing project information to agencies. In the final outcome, the Corps evaluated the agencies' conditions and made the decision to issue the permit.

The applicant, York Steel Co., proposed to fill 63 acres of tideland, adjacent to the Alaska Railroad line on the Anchorage waterfront, for a port facility, small mooring basin, storage, and office building. The Corps issued a public notice in March of 1978 and determined the need for an Environmental Assessment based upon comments received. NMFS, FWS, and the Municipality of Anchorage requested further information and the preparation of an environmental assessment. Several state legislators responded in favor of the project. The applicant met both with the Corps and with the agencies to explain the project and be apprised of the agencies' comments. The meeting was requested by NMFS. All comment letters received by the Corps were forwarded to the applicant with a suggestion for consultation with the various agencies.

In April the applicant met with the Corps to discuss engineering and technical problems with the project. The Corps also determined after receiving all comments on the public notice that an environmental assessment would be required. The Corps then attempted to resolve whether they or the Alaska Railroad (a federal agency which holds the lease on the subject property) should be lead agency.

During this time NMFS and DFG met with the applicant several times and received the project information they needed. In June these two agencies recommended approval of the project with conditions to protect the anadromous fisheries of the adjacent waterway, Ship Creek, and insure the water-related nature of the project. The applicant did not consult FWS, EPA and the Municipality of Anchorage, all of whom wanted a more detailed environmental analysis. The applicant provided the Corps with a more detailed drawing of the project. After negotiating to be the lead agency the Corps began preparing an environmental assessment in October 1978 and released the 23 page draft document in February 1979. The applicant met with the Municipality during this period to outline the objectives of the project.

The FWS and EPA received the draft environmental assessment and continued to object to the project. EPA and FWS cited the lack of substantial data to justify the need for the project as required by the 404(b)(1) guidelines and objected to the non-water dependent office, storage and parking facilities. They continued to oppose the project, awaiting further information. The Corps responded to these objections by letter and outlined all additional information they had.

The Corps decided to issue the permit, triggering both EPA and FWS to request elevation (July 1979). Eventually these two agencies through negotiations with the applicant reached an agreement. The project was revised to reduce the amount of fill by three acres and the parking, storage and office building removed. In addition, the applicant offered to eliminate the small mooring basin in order to facilitate the permit process. By early August 1979, EPA and FWS had resolved their objections and submitted conditions by which they approved the permit.

The Corps issued the permit in September 1979, two years after submission of the application. The Corps rejected one of the conditions that FWS had included to protect a small area adjacent to the fill site as a bird habitat. The conditions applied to the permit, along with the agency requesting them, are listed below:

- a. that all structures and activities located on the area of the fill shall be consistent with the provisions of Section 404(b)(1) (water-dependent uses) of the Clean Water Act; FWS, EPA, NMFS, ADFG

b. that authorization for the proposed maintenance dredging of the harbor shall be initially limited to 3 years from the date of this permit, subject to review by the District Engineer for renewal for greater periods of time; FWS

c. that the salmon migratory corridor along the mouth of Ship Creek shall not be obstructed. If dredging is required, then it shall be performed as jointly recommended by the National Marine Fisheries Service, Alaska Department of Fish and Game, and the U.S. Fish and Wildlife Service; NMFS, ADFG, FWS

d. that the fill shall not be used for permanent storage of petroleum products other than those products incident to the ongoing operation and maintenance of the facilities, as described in the approved plan; NMFS, ADFG

e. that the permittee shall prepare and submit a spill prevention control and countermeasure plan if petroleum products are to be handled, transferred and/or temporarily stored on the fill; NMFS, ADFG

f. that no suction dredging shall be conducted between 1 April and 1 July of each year; NMFS, ADFG

g. that no dredging shall be conducted along the north bulkhead from 1 April to 15 October of any year. NMFS, ADFG (Corps of Engineers, Knik Arm 48. file)

NMFS, EPA and FWS have considerably revised their application of the water-dependency criteria to projects in Alaska, particularly in Anchorage, as the next case shows.

Star Development Company

Prior to completion of the Anchorage Wetland Plan, the Corps continued to process permit applications for wetland fills in the municipality. One case, involving the Star Development Company, exemplifies the difficulty of resolving a local planning program with a federal permit authority having statutory requirements that are unrelated and unresponsive to the planning process.

The applicant proposed to fill 20 acres of black spruce swamp in Turnagain Bog for a residential subdivision. The Corps determined no EIR was needed and issued a public notice in July, 1981. Three agencies requested denial: the Alaska Department of Fish and Game, the Fish and Wildlife Service and EPA. Their primary justification was that this area had been classified as a preservation environment under the Anchorage Coastal Management Plan (CMP). The CMP defines this classification: "The emphasis in the Preservation Environment is on preservation and restoration of natural systems and resources, and prevention or regulation of uses and activities which would degrade or destroy the natural environment."

The Corps forwarded copies of the agencies' letters to the applicant and requested he resolve these problems. Although no meetings were held between all the agencies and applicant during the permit process, through consultations with Fish and Game the applicant learned that DFG would be forced to recommend denial because the project was inconsistent with the CMP requirements. He did not contact EPA or FWS.

The Municipality of Anchorage, in contrast, approved the permit, responding:

"It is the conclusion of the municipality staff that the term preservation no longer can adequately be applied to this area. Prior to State adoption of the Anchorage Plan, several permits were issued for subdivisions in this immediate area. Utilities and streets have been put in, thus altering the area so that it no longer has "some unique natural features considered valuable in their undisturbed or original condition."

The Department of Fish and Game continued to object to the project:

"We understand that the Municipality of Anchorage Planning Department recommends that the subject developments are consistent with the Anchorage Plan. They base their recommendation on Policy Six. We believe that a consistency determination should be based on all nine recommended policies. Our position is based solely on the Anchorage Plan. This plan and the planning process provides the framework for objective consideration of the uses of the wetlands remaining in the Anchorage Bowl. To find these developments consistent with the Anchorage Plan without regard to the planning process defeats the purpose of the Anchorage Plan. Turnagain Bog may very well be suitable for development. If development of residential subdivisions in this wetland is desired by the Municipality of Anchorage, then this area should be reclassified through the planning process. To do otherwise makes a mockery of the planning process and renders the Anchorage Plan useless."

In October, the Department of Policy Development and Planning found the project to be consistent, thus overruling DFG and causing EPA to withdraw their objections. The Department of Environment Conservation issued the required 401 water quality certification.

The FWS continued to object to the permit and requested the Corps to elevate the application to the Division Engineer in November 1981, five months after issuance of the public notice. Their concerns centered on the cumulative effects on wildlife and avifauna of several proposed and approved permits in the Turnagain Bog and a pending plan for expansion of the Anchorage airport onto 150-200 acres of this same wetland.

They cited the hydrologic importance of these wetlands in stabilizing the levels of downstream lakes used for landing float planes. The project, FWS maintained, did not mitigate the loss of these wetland values. In addition they felt the permit issuance was inconsistent with the Anchorage Coastal Management Plan:

"Federal agencies in the Anchorage area are appropriately involved in many aspects of areawide, long-term resource use planning. At some point these agencies endorse plans that achieve an acceptable balance of resource development and protections. It is important that plans endorsed by federal agencies be implemented in accordance with the provisions of those plans. When local and/or state governments endorse land use decisions contrary to previously approved plans, it is incumbent upon federal agencies to oppose those actions which are contrary to plans which were designed and approved to protect the public interest in resource utilization."

"A condition for approval of the Anchorage plan was that a wetlands management plan be prepared. We and other agencies are cooperating with the municipality in preparation of this plan. However, decisions are now being made which will compromise the credibility of the Anchorage CMP and limit the options for the developing wetlands management plan."

"Specifically, about 126 acres of 'preservation' wetlands in Turnagain Bog would be developed in subdivision under issued and pending permit applications. We feel that if the municipality intends to allow development of designated preservation units, the decision should be based on an objective assessment of all available data. The coastal plan should then be formally amended, after sufficient public review, rather than continuing the piecemeal permit-by-permit amendment approach."

The Corps continued to request permit approval and justified their position:

"The consistency issue is not directly related to the statutory mandates and concerns of the Department of the Interior. The review of a proposal for consistency with the approved Coastal Zone Management Plan is, in this case, the responsibility of the Municipality of Anchorage, or ultimately the State of Alaska, Division of Policy Development and Planning."

"The USFWS objection to the fill centers on the lack of an acceptable mitigation plan and not on any quantifiable impact on wildlife resources. The attempt to achieve mitigation is not being pursued with the applicants but with the Municipality of

Anchorage. The applicants are thus suffering delay and financial hardships while USFWS pursues negotiations for mitigation that are indefinite in duration and outside the applicant's means to influence. The mitigation requirement is questionable since the need has not been identified as a requirement that they must fulfill before issuance of a permit would be acceptable. The requirement for mitigation has been presented to the Corps as a unilateral demand by the USFWS, but this demand is one which the Corps cannot impose upon the applicants since the applicants do not own the lands under consideration for the mitigation."

"The USFWS is demanding that the Municipality of Anchorage amend its Coastal Management Plan to conform to the USFWS interpretation of that plan or to mitigate the proposed activity by guaranteeing like amounts of land will be set aside elsewhere in Turnagain Bog. These demands are outside the Service's jurisdiction and authority both in the case of the consistency determination and in the unilateral determination that mitigation is an absolute requirement before the Service would consent to the development."

"In the absence of critical resource values and in view of other valid considerations of the public interest, loss of wetlands acreage itself is not overriding. There are extensive wetlands acreage immediately contiguous to the contested area capable of serving the small wildlife populations that might be displaced. There are tens of thousands of acres of identical wetlands immediately across Cook Inlet, and those wetlands are for more productive and critical than the urban wetlands in question. The USFWS insistence that permitting decision await and be contingent upon a Municipal Wetlands Management Plan that is only in draft and far from implementation is unreasonable."

During the elevation review, FWS met with the municipality and other agencies to review the problems at Turnagain Bog. They were assured by a commitment from the municipality and State Department of Transportation and Public Facilities to preserve those areas of the bog under state and public ownership (the 150-200 acres of wetland discussed in the airport plan). The FWS subsequently withdrew their objections in December 1981 and the permit was issued the same month with no conditions attached. (Corps of Engineers, Knik Arm 63 file)

The Corps followed their regulations strictly in issuing the permit, while the FWS focused its concern on preservation of the wetland resource and need for mitigation. FWS pursued their objectives through local planning channels. These types of conflict between local ongoing planning and the Corps permit process, place the resource and applicant in jeopardy while two conceptually related

but separate administrative systems carry out their operations. In addition, this case illustrates the problem of unclear definitions of wetland value and the need for further clarification of "developable" wetlands. The Anchorage wetland plan now provides these definitions.

Anchorage Wetland Management Plan

The Corps assisted in the preparation of the Anchorage wetland management plan, a specific resource management plan commissioned by the Municipality of Anchorage in response to continuing development pressure on wetland areas. The plan attempts to balance urban growth and protection of remaining wetland areas in Anchorage through local government planning and control mechanisms. Currently the Corps is preparing a general permit to be issued to the municipality for developments proposed in wetlands covered by the plan. The Corps is also revising the municipality's large scale wetland maps to show specific wetland regulatory boundaries. (Reed, Rockwell, pers. comm.)

The plan includes several wetland studies, maps, a classification system for wetlands, a hydrologic study, a resource analysis, and a management plan. The primary function of the plan is to determine which wetlands have the most significant values for wildlife habitat, water quality, flood control, groundwater recharge, water purification, drinking water sources, recreation, cultural and aesthetic features, and those which have marginal and minimal value. Four classifications have been assigned to Anchorage wetlands. 1) preservation, which precludes any development; 2) conservation, which allows limited development with mitigation measures; 3) developable, which allows complete draining and filling; and 4) special study, which are those requiring further environmental data to determine their status. The plan has largely been a success; the state Coastal Policy Council and the Anchorage Assembly have both approved it. As evidenced by Ms. Angie Dugick's testimony (see page 4-54), wetland owners and developers as well as agencies and conservationists participated in the planning process through a special committee. However AOGA (Alaska Oil and Gas) voiced criticism to the concept of wetland planning in the Anchorage area. (Pichon pers. comm.) In addition the Corps' continued effort has applied the plan's results to the 404 program. This should facilitate general permit issuance and solve some of the wetland problems in this area. Alaska Department of Fish and Game has expressed concern that applying developable vs. preservation classifications was not adequately justified by the plan. This agency feels that a more intensive study would have documented the particular values of each wetland, to provide a basis for comparison. (Clausen, pers. comm.)

Don Benson - Palmer Airport Project

This case history is a current source of controversy in Alaska and demonstrates several problem areas in the 404 program. The applicant is an individual not a corporation or larger financial interest. Consequently, his case has gained considerable attention in the state. The Corps unfortunately made errors in determining jurisdiction and in processing the permit.

The applicant, after obtaining a local use permit began constructing an airstrip, maintenance facility, float plane lagoon and access roads in a wetland area near the Glenn Highway in 1978. The Corp in March of 1979 issued a cease and desist order after the FWS reported the violation. The Corps visited the site shortly thereafter and determined it to be a wetland but could not find indication of direct hydraulic connection to the adjoining area. Without such connection the project was under the authority of a nationwide permit. The Corps informed Benson of their findings.

However, the FWS had also reported a violation adjacent to the Benson property. The Corps determined this adjacent property to be under individual permit authority despite its direct connection by culvert to the Benson site. With this evidence, the FWS requested the Corps to re-evaluate the Benson case. In February 1980 they reversed their position and sent Benson a letter requiring him to apply for an individual permit. This reversal came one year after their original determination. The applicant claims he did not receive this letter (which was not sent certified mail), and continued his work.

In January 1982, the Corps again issued a cease and desist order and requested Benson to apply for a permit. Both FWS and the Alaska Department of Fish and Game strongly objected to the project. They feel the wetland, which is adjacent to the Palmer Hayflats game reserve, is a valuable habitat, the project is not water-dependent, and that many alternative sites exist. The Corps, however, holds that alternative sites at nearby airports suffer from extensive wind damage and are unavailable to the applicant. They have announced their intention to issue the permit for the project as originally conceived, and the FWS has requested elevation. The Alaska Department of Fish and Game was overruled in its objections by a finding of consistency from DPDP, based on the local need for the project. No final decision has been made on the elevation. (Wolfe, pers. comm.)

The Corps in this case acted inconsistently in making their wetland determination. A road berm near the site which physically separated the Benson site from apparent hydrologic connection with the adjacent site, did have culverts in it. This oversight could have been avoided by closer examination. (Nickels, Clausen, pers. comm.)

Kenai River (overview)

The Kenai river, located southwest of Anchorage on the Kenai Peninsula, has been a center of a great deal of controversy with the 404 program. The concern over the river arises from its use as salmon spawning stream for the Cook Inlet fishery and its continued development as a resort area. The lower river corridor stretches for 194 square miles with extensive (11,000 acres) wetlands at the river mouth. The evident pressure for development in this corridor coupled with the presence of a large number of illegal fills, and the lack of wetland resource data on which to base decisions spurred the Corps to offer some guidance. In 1978 the Corps completed the Kenai River Review, the first regional wetland planning document of Corps origin in the state.

The review presents profiles of various environmental characters of the area: physical, biological, land and water use, socioeconomic, historic and aesthetic. The review then classifies various types of activities within subareas of the lower river corridor and rates the activities according to their permit characters. Each activity may be allowed but conditioned, denied, or deemed not under Corps jurisdiction. Special conditions are outlined for each type of allowable activity. The review does not represent final decisions on permit actions, as the Corps must evaluate each on a case-by-case basis. (Corps of Engineers, 1978) Theoretically, the review should create a level of predictability for landowners and applicants in this area.

However, in practice, the Corps has been criticized for not strictly adhering to its policies as set forth in the review, approving permits in spite of the Corps' own recommendations to the contrary. (Pichon, pers. comm.) The review is not used to justify the denial of permits. Two cases from this area exemplify a relatively straightforward, typical permit action and a controversial application.

Chester Cone Property

The applicant, Chester Cone, originally homesteaded 160 acres along the Kenai River. After he began a recreational development in 1978 on this property, the Corp issued a cease and desist order. At this time the Corps was completing the Kenai River Review and was determining the status of much of these lands. Mr. Cone's property lies on the southside of the river in the Kenai River Flats, an 11,000 acre wetland containing habitat for migratory snow geese and salmon. The applicant submitted an application to which the FWS and other reviewing agencies objected, based upon the well-documented value of this wetland area and the configuration of the project, which extended to the river banks. Eventually the Corps also denied the permit; however, much delay was involved in their decision (2-1/2 years).

Most recently, Mr. Cone submitted an application for development along the northside of the river outside a wetland area. FWS and other reviewing agencies have made no objections and the permit should be issued forthwith. (Nickels, pers. comm.)

The Corps is currently holding many 404 permit decisions in abeyance for the Kenai River area pending completion of a special study by the Alaska DFG. The study will examine the individual and cumulative effects of various structures (jetties, ramps, etc.) on salmon habitat. The study is needed to better analyze the impacts of the developments being proposed. The Corps does expect to begin processing permits in this area again soon. (Wolfe pers. comm.)

City of Homer, Small Boat Harbor

This recent permit action reveals the benefits of preapplication meetings and negotiations between applicants and agencies. It also illustrates a conflict over mitigation policy as construed by the Corps in Washington and by the resource agencies. The mitigations required for this project were agreed upon by all parties concerned and appear to be balanced between the project's effects and the project site's biologic resources. However, particular Corps policy overruled the inclusion of several of these mitigations.

In December, 1981, the City of Homer on the southern tip of the Kenai Peninsula proposed to fill 1,615 acres of sub/intertidal area on its shoreline. The site was part of the Kackenmak Bay Critical Habitat Area, administered by the Alaska Fish and Game Department. The fill would accommodate a staging area for a ferry and barge loading dock as part of the City's future port developments. Fill would be provided by dredge spoils from a nearby Corps harbor expansion project.

Prior to release of a public notice and pending additional information, the City of Homer held a meeting at the Corps' office to discuss the project. EPA, FWS, NMFS, and ADFG voiced concern over habitat loss, sediment transport effects, need for evaluation of alternatives, and mitigation for losses. Following this meeting, in January 1982 the Corps released a public notice and began an environmental assessment. The environmental assessment included an infaunal study of benthic organisms on the project site and a discussion of five alternatives. These studies supplemented other biological investigations and engineering surveys of the Homer spit area which had already been prepared.

Another meeting with agencies and the City officials was held in early February. At a follow-up meeting two weeks later, the FWS proposed a set of five conditions to offset the project's adverse effects.

The City agreed to these, and consequently response letters from EPA, FWS, NMFS, and Alaska DFG, and the consistency determination from DPDP all reiterated these conditions and approved the project. One of these conditions addressed the water quality concerns of the Department of Environmental Conservation and all six conditions were placed upon the Habitat Protection Permit issued by DFG for the activity inside a State Critical Habitat Area.

The Corps issued the permit in May, 1982, four months after issuance of the public notice. However, the permit contained only four of the conditions which the agencies had requested. These were:

1. That activities occurring on the marshalling/staging area shall be limited to water-dependent and water-related uses only (those activities associated with the fill must have direct access or proximity to or be located in the water in order to fulfill their basic purpose).
2. That the biological impacts and flushing patterns associated with the Seward Fisheries cannery outfall line shall be monitored for a period of one year. Upon completion of the monitoring study, the extension and location of the outfall line shall be determined.
3. That staged construction, requiring the construction of a retention berm around the disposal site to avoid runoff or sloughing of dredged spoils into marine waters and to avoid suspended solids from entering the water column, shall be adhered to.
4. That there shall be no dredge or fill work seaward of mean higher high water (MHHW) between 1 May and 15 July to avoid migrating pink salmon fry, except in the designated small boat harbor area. That inwater work shall be reduced to the smallest extent practicable by performing construction activities during low tidal stages.

The Corps had not included the last two stipulations nor had they informed the agencies of their intention not to do so. The Corps believed that because the City of Homer had agreed to the conditions they did not need to be stated on the permit itself. In addition, one condition required off-site mitigation which current Corps policy had ruled as not acceptable. (Nickels, Smith, Thurston, pers. comm.) The two conditions were:

5. A minimum of 30.5 acres seaward of mean lower low water (MLLW), encompassing 1/4-mile of beachfront on the northeast side of the Homer Spit located in an area between Lot #6 and the western expansion of the Small Boat Harbor, shall be dedicated in perpetuity as open space limited to recreational uses.

6. Public recreational access for fishing and shellfishing activities shall be provided for in the design of project features associated with the dock and port operations through the development of a recreational use plan.

The FWS met with the Corps to resolve this problem by modifying the permit, but no solution has been achieved. In spite of this, the City signed an agreement in July, 1982, with FWS to dedicate the 30-acre parcel. (Corps of Engineers, Kachemak Bay 94 file)

Southeast Region

Much of the land in this region is managed for timber harvesting by both the U.S. Forest Service and Sealaska Native Regional Corporation. The steep sloped landscape necessitates that tidelands be used for sites to store and transfer logs to barges or to adjacent water storage areas until transfer to barges. Consequently, timber operators must obtain 404 permits for these transfer sites.

Approximately forty 404 permits for log transfer sites occur each year submitted by the Forest Service for private timber operators under lease on federal land and by Sealaska Corporation. (Nishimoto, pers. comm.) Generally, the Forest Service and FSW conduct planning and negotiations well before submitting applications in order to site the transfer facilities in the best possible locations. Logistically the sites require relatively deep water and enough surface area for equipment and log storage. (Harmening, pers. comm.) From a resource protection viewpoint, the sites should fill a minimum of coastal marsh, have sufficient flushing capability to remove any bark residues resulting from floating log storage which might build up on tidal and subtidal flats and be remote from eagle nests and anadromous fish stream. (Nishimoto, pers. comm.)

One problem with the 404 permits are their limited applicability for one year after issuance. Timber sale schedules and 404 permit processing do not always coincide making a permit obsolete well before construction begins. A two to three year time period would allow leeway for timber operations as well as a measure of lead time for planning timber sales with approved 404 permits for log transfer facilities. ANILCA requires the harvesting of 450 million board feet of timber in the Tongass National Forest every year. If 404 permits are delayed, this quota is some times difficult to reach. (Harmening, pers. comm.)

In addition to 404 permits, the State Department of Natural Resources must grant a tideland lease or right-of-way permit and will not do so until the Corps issues the 404 permit. A coastal plan consistency determination is also required. Occasionally log transfer sites are the sub-

ject of controversy due to their location in relation to individual homesites, harbors, particular wildlife resources or as a means to limit logging on the forest lands. (Harmening, pers. comm.) Nevertheless, as the example below demonstrates, most applications proceed smoothly as a result of consultations between the applicant and the resource agencies. The Corps does not usually take an active part in these negotiations. (Nishimoto, pers. comm.)

Log Transfer Facility - Frederick Sound

Sealaska Timber Corporation proposed a five part facility including a log bundle transfer ramp, a barge ramp, a seaplane float, a log boom area enclosed by breakwaters, and a log storage area. Their application was made in early May and the Corps released a public notice late May, 1981. In response, FWS, ADFG, EPA, and NMFS all requested a thirty-day extension (beyond the thirty-day comment period) in order to complete a site visit and biologic reconnaissance. By the end of July, the resource agencies all responded to the public notice approving the project as long as the fill for the barge ramp was consolidated with fill for the log transfer ramp, thus impacting a smaller area of intertidal habitat. Both the DEC 401 certification (dated August, 1981) and the DPDP consistency determination (dated August, 1982) included this condition as well. In July, 1981, the FWS specified the applicant must comply with four other conditions:

1. In-water log storage shall be permitted only for rafting purposes; there shall be no over-winter storage of logs.
2. Logs shall not be permitted to ground at any tidal stage.
3. A minimum undisturbed buffer of 330 feet shall be maintained around all eagle nests.
4. Blasting shall not occur within a half-mile of an active eagle nest during March 1 and August 31.

The applicant agreed to consolidate the ramp fill and the four additional stipulations were added to the permit which was issued in March, 1982. (Corps of Engineers, Frederick Sound 48 file)

City and Borough of Sitka

The City/Borough of Sitka completed their coastal management program in 1980. The plan encompassed extensive resource information compiled by the Alaska Department of Fish and Game and input from a committee composed of industry, conservation and city representatives. After approval by the Coastal Policy Council, the City/Borough applied for general permits from the Corps for several categories of minor

activities (small boat docks, mooring buoys, domestic sewer outfalls, small protective rock fills). Activities were required to be consistent with the Coastal Management Plan and are reviewed by the local planning director, DEC, and ADFG. The planning commission also holds a public hearing. This process is an example of the constructive use of general permits to both facilitate development within the bounds of local control and reduce the Corps workload for insignificant projects. (Alaska State Office of Coastal Management, 1981) Although other cities in the southeast are subject to continuing developmental pressure in wetland areas, no other general permits based upon coastal management plans have been approved. (Souby, pers. comm.)

Lemon Creek Sand and Gravel Mining

This permit action involved several sand and gravel mines in Lemon Creek which had been in operation without a permit for a number of years. The illegal activities were near Juneau and highly visible to many people. Consequently, the lack of firm action by the Corps to curtail or stop the operations after several cease and desist orders tended to affirm, in the public eye, the ineffectual enforcement of the 404 program. However, eventually through negotiation the Corps resolved the problems by issuing after-the-fact permits covering an interim period of three years. The Corps and agencies are seeking a final resolution through the preparation of a plan for resource management in Lemon Creek. Another parameter of this case is the degree to which water quality concerns are reflected in the 404 permit as a result of 401 certification.

In August, 1980, the Corps inspected unauthorized activities involving discharges into the Channel of Lemon Creek from four gravel mining operations. Although the Corps has no jurisdiction over the excavation of material from a streambed, they do regulate any deposit or stockpiling of material in the creek adjacent to the mining operation. Throughout the Fall of 1980 and Spring of 1981, the Corps issued cease and desist orders to no avail. In September, 1981, the Corps sent a letter to the violators and also requested comments from the resource agencies. In February, 1982, the Corps, gravel operators, and agencies developed an overall gravel extraction plan which was presented and discussed at a public workshop in March. The Corps released separate public notices for each operation in March, 1982, which outlined the plan. Detailed descriptions of allowable activities included fill for construction of equipment, operating pads and haul roads, areas approved for gravel removal, seasonal restrictions, and a number of special conditions. These conditions were also included in the public notice and primarily concerned protection of anadromous fish and reduction of stream turbidity and bank erosion. A public hearing was held on the projects in which five individuals testified in favor of the operation and five against.

The permit was issued in early April, 1982, barely a month after release of the public notice. Both the conditions specified in the public notice and an additional six conditions appeared on the permit. These are listed below with the initials of the sponsoring agency.

1. That the applicant vegetate all denuded areas (except for designated roads and work pads) above the annual floodline, with grasses and shrubs. The vegetated area shall extend upland to Davis Avenue on the north bank of Lemon Creek and the permanent haul road on the south bank. Seeding shall begin by 30 May 1982. This vegetated area shall be maintained for the life of the project. All plantings will be subject to the approval of the District Engineer and will be implemented and maintained to the satisfaction of the District Engineer. FWS, NMFS, EPA
2. That following breakup (1982), the Corps, in consultation with resource agencies and the applicant, will identify areas that shall be riprapped. By 15 June 1982, the applicant shall submit a plan (including an implementation schedule) to riprap unstable banks. By 30 June 1982, the applicant must begin to implement the plan. FWS, EPA, NMFS
3. That workpads (bailing pads with stockpiles) with a maximum width of 75 feet may be constructed along the actively flowing channel. The width of the workpad will be measured from the edge of the actively flowing channel away from the channel for a maximum distance of 75 feet. No work pad shall encroach into the active stream channel. FWS
4. That the property line of the applicant shall be staked to help in monitoring project activities. FWS
5. That removal of gravel will be conducted in such a manner as to preclude the creation of ponds which would entrap fish during low water. FWS, NMFS, AFG
6. That gravel extraction will be physically separated from the active stream channel either by the placement of a berm or by maintaining a 5 foot separation zone between all portions of the excavation and the active stream channel. Gravel extraction will be limited to an area 1,500 feet long, 40 feet wide, and eight (8) feet deep. DEC
7. That prior to 15 April or in the event of high water inundating the floodplain of Lemon Creek, any excavated channel outside the active flow channel will be constructed to prevent fish entrapment. DEC, NMFS

8. That gravel extraction within the active flow channel of Lemon Creek will not result in an increase of 25 NTU's above background levels 500 feet downstream from the active gravel extraction area. DEC
9. That upon written notice from the Alaska Department of Environmental Conservation that water quality standards have been violated, instream gravel extraction operations shall cease. DEC
10. That there will be no stockpiling of any material from 15 April to 15 June. The applicant will have from 15 April to 30 April to remove all existing stockpiles. From 15 June to 15 August stockpiles will not exceed 10,000 cubic yards of sand and gravel material, and from 15 August to 1 March, no more than 3,000 cubic yards of material will be stockpiled. FWS, NMFS, EPA
11. That bailing pads will be sloped away from the stream and there will be a three-foot minimum set back from edge of pad to toe of stockpile; these are intended to direct water from the stockpiles away from the stream during dewatering or rain. FWS, NMFS, EPA
12. That the applicant will keep their stretch of the creek free of log jams and will maintain the surrounding area from litter and garbage build up. All equipment will be removed from the site when sand and gravel removal is complete. FWS, NMFS, EPA

DEC developed four stipulations through the 401 certification. The 404 process thus becomes the vehicle for expressing a number of concerns surrounding these projects. DEC is responsible for water quality monitoring during this time and consequently enforcement of water quality standards imposed through the 404 permit.

The resource agencies approved the permit for three years and required preparation of an overall resource management plan for Lemon Creek during this interim period. Such a plan will include an impact analysis, watershed study, resource data, and be prepared cooperatively between agencies. Ultimately, this plan would reduce the need for strict monitoring and allow for a permanent solution to the environmental problems in Lemon Creek while allowing a degree of gravel mining activity to continue. (Corps of Engineers, Lemon Creek I File)

U.S. Borax Quartz Hill Mine

This permit involved a complicated decision making process between the U.S. Forest Service and the Corps of Engineers. The project is also the first major mining operation of many proposed in the state for which the Corps has issued a permit.

The Quartz Hill deposit is within the Misty Fjords National Monument but was deleted from wilderness status by ANILCA. The large deposits of molybdenum which characterize the mine were known of at the time of ANILCA's passage and specific mention is given in the law to allow development of the mine. Forest Service lands surround the deposit and consequently access roads, transport, and mining facilities must be built on these public lands. In addition, wetlands, streams, and tidelands occur along the proposed road thus requiring a Corps permit for construction.

ANILCA states that a separate EIS shall be completed by the Secretary of Agriculture for the bulk sampling or exploratory phase and the extraction/mine development phase. But the access road constructed for phase one must also be upgraded and used for phase two. This clause forces a rather difficult situation in planning a road during phase one which is adequate for all activities of phase two development without benefit of the result of phase one exploration. Consequently, the alignment of the road became both a controversial and difficult decision which had to be resolved between the applicant, U.S. Borax, and the Forest Service, the Corps and other reviewing agencies.

The Corps' first involvement in this project was as members of an interdisciplinary team (IDT) organized by the U.S. Forest Service for input into the EIS on phase one exploration. The Forest Service EIS describes two access routes for bulk sampling: one in the Keta Drainage and one in the Blossom Drainage. Both access routes would involve mine tailing disposal at separate points - Wilson Arm/Smeaton Bay for the Blossom route and Boca de Quadra for the Keta route. Disposal into the Wilson Arm was objectionable on a number of grounds - greater impacts on fisheries and recreational users. Boca de Quadra was the designated disposal site.

Despite a lack of evidence in the EIS, the Forest Service chose the Blossom route as the preferred alternative for several reasons based upon their desire to establish a single route for both phases of mine development. Their reasons are outlined below:

- 1) more favorable safety factors (snow avalanches and air and water transportation)
- 2) more options for town sites
- 3) shorter and more protected marine transportation routes
- 4) more efficient arrangement of mine site facilities
- 5) long-term economic advantage

However, the IDT team recommended the Keta route be the preferred access as did the State of Alaska. This conclusion was based on tailing disposal in Boca de Quadra, less environmental damage, and lower construction costs from the Keta alternative.

In April, 1982, the Corps received an application for a section 404/10 permit from U.S. Borax for the Blossom River route. The applicant requested that the permit be applicable to any alternative route which the Forest Service might chose in the final EIS on the phase 2 activities. The Corps public notice contained descriptions of both routes and was issued in May, 1982. The project included not only a 9-1/2 mile access road but also a barge ramp, yard, tank farm, sea plane float, and two stiff leg booms constructed on fill in a tideland. The Corps, after completing an environmental assessment, reviewing the EIS, and having participated on the IDT, initially recommended the Keta route be permitted rather than the Blossom route. NMFS and FWS also favored the Keta route. ADFG, DPDP, and DEC had no objections to the Blossom route as long as certain conditions were met. Three citizens groups recommended denial of the permit. Consequently, a number of agencies disagreed over the choice of access routes and the Corps was forced through the 404 permit process to determine which route was in the public interest. Therefore, the District Engineer consulted with the applicant's design engineers in order to better understand the eventual development phase of the project. He stated "The meeting was opened by outlining the actions by the Alaska District which had led to a tentative recommendation for denial of the U.S. Borax request for a permit to construct facilities in support of the bulk sample access road through the Blossom River drainage. The comments dealt specifically with the finding that consideration of the impacts of the bulk sample access road in each of the two alternatives routes, disregarding the potential cumulative impacts after a final mine development road route was selected, led to a conclusion, supported by the FEIS, that the route through the Keta River drainage was the more desirable alternative. Although it is clear that constructing the bulk sample access road within the prism of the ultimately developed mine access road would minimize the environmental impact of the road, the detailed analysis of the final road location was yet to be developed as part of the mine development EIS now under preparation. Thus, to reach a permitting decision which would best represent the public interest, it was necessary to gain some knowledge and confidence in the direction of planning to date."

The engineers laid out their reasoning for choosing the Blossom route based upon - safety factors from avalanches, landslides, and air flight; worker travel distance; siting of a mining workers' town in the Blossom drainage; waste rock disposal; mill site location; and tailing transport via pipeline to Boca de Quadra.

The District Engineer stated "It was my conclusion that the discussions supported a position that the various aspects of mine development favored a long-term, permanent access road in the Blossom River drainage. Thus, the construction of a bulk sample access road along a similar alignment would minimize the cumulative environmental impacts."

In August, 1982, both the Corps and the Forest Service issued their permits for the Blossom route. A NPDES permit was also required from EPA as well as 401 certification, and an anadromous stream permit from ADFG for all channel crossings. The Forest Service use permit has extensive specifications regarding road building and facility siting and includes three conditions:

- 1) Tailings disposal will not be authorized in Wilson/Arm Smeaton Bay. (Requested by the State of Alaska)
- 2) A continuous surface access road from the mine to Boca de Quadra will not be permitted.
- 3) The bulk sample access road must be constructed substantially within the design prism of the future mine development road. (ANILCA requirement)

The Corps permit included 12 stipulations:

1. This permit shall be temporary in nature with a termination date of 30 days following the publication of the Record of Decision for the mine development EIS.
2. Should the mine development EIS find that an access route other than one through the Blossom River drainage is more appropriate, all structures and all fill placed in wetlands, streams, and tidelands as a result of this permit will be removed and immediate restorative measures will be taken to return the impacted areas to their original state.
3. Bridge abutments on either bank of Tunnel Creek and South Tunnel Creek must be positioned above the stream's ordinary high water mark. The center support for the Tunnel Creek crossing must be positioned on the gravel bar at the proposed crossing site.
4. No discharge of dredged or fill material shall be placed in tidally influenced waters, Tunnel Creek, and South Tunnel Creek until ninety percent of salmon eggs sampled have eyed up.
5. Riprap will be brought up in lifts coincident with road fill in estuarine areas.
6. Cut banks and other disturbed areas shall be reseeded during the growing season following construction.
7. The floating camp, seaplane float, stiff-leg boom, and log rafts shall not ground at any tidal stage.
8. Fill materials shall be limited to shot rock and clean gravel only.
9. The working surface of the tideland facilities shall be maintained in a manner to prevent runoff and surface drainage.

10. At station 423+00, Beaver Creek, the stream shall be diverted around the pipe and the excavated channel until the pipe is completely bedded.
11. All blasting shall be in accordance with best available techniques to prevent the discharge of material into watercourses.
12. All conditions and provisions of the Forest Service Special Use Permit, issued 23 August 1982, are hereby incorporated.

The Forest Service, Corps, and NPDES (issued by EPA) permits do not duplicate each other in the specific conditions they require. Rather, each addresses particular concerns of the project. (Corps of Engineers, Smeaton Bay 4 file)

Other Regions

The Corps has issued or is currently issuing a series of general permits for "construction of access roads, driveways, foundations pads related and limited to residences sanitation facilities and village clinics in wetland areas". These general permits cover thirteen areas of the state coinciding with State Housing authority regions. Individual permits are still required in the Yukon-Kuskokwin Delta, Tanana and Yukon Flat areas. The permits are designed to facilitate construction of state and federally funded housing and village projects in remote rural Alaska towns. Special conditions on the permits primarily specify dimensions of building pads, need for proper drainage and limitations within 100 ft. of a river, stream or lake.

APPENDIX B

VEGETATION COMMUNITIES OF ALASKA OF POTENTIALLY WETLAND CHARACTER^{1/}

WET TUNDRA

Shrubs

Willows
Shrubby cinquefoil
Bog cranberry
Dwarf birch
Blueberry
Resin birch
Bog rosemary
Lingonberry

Salix spp.
Potentilla fruticosa
Oxycoccus microcarpus
Betula nana ssp. *exilis*
Vaccinium spp.
Betula glandulosa
Andromeda polifolia
Vaccinium vitis-idaea

Herbs

Buttercup
Purple mountain saxifrage
Cloudberry
Louseworts
Marsh fivefinger
Marsh marigold

Ranunculus spp.
Saxifraga oppositifolia
Rubus spp.
Pedicularis spp.
Potentilla palustris
Caltha palustris arctica

Grasses and Sedges

Arrow grass
Holy grass
Snow grass
Bluejoint
Pendent grass
Tundra grass

Triglochin palustris
Hierochloë pauciflora
Phippisia algida
Calamagrostis spp.
Arctophila fulva
DuPontia fischeri ssp. *psilosantha*
Eriophorum angustifolium
Eriophorum spp.
Carex spp.
Juncus spp.
Luzula Wahlenbergii ssp. *Wahlenbergii*

Cottongrass
Sedges

Rushes
Woodrush

Lichens, Mosses, and Liverworts

Lichens (reindeer moss)

Cladonia spp.
Cetraria spp.
Sphagnum spp.

Mosses
Liverworts

^{1/}All species listed for each community may not be present in all regions of Alaska. These species lists are not intended to be comprehensive; many additional species may be present at any locale.

MOIST TUNDRA

Shrubs

Dwarf birch
Netted willow
Labrador tea
Lapland rosebay
Mountain alder
Sitka alder
Lingonberry
Crowberry
Willows
Resin birch
Lapland rosebay
Bearberry
Blueberry
Bog cranberry

Betula nana ssp. *exilis*
Salix reticulata ssp. *reticulata*
Ledum palustre ssp. *decumbens*
Rhododendron lapponicum
Alnus crispa ssp. *crispa*
A. crispa ssp. *sinuata*
Vaccinium vitis-idaea ssp. *minus*
Empetrum nigrum hermaphroditum
Salix spp.
Betula glandulosa
Rhododendron lapponicum
Arctostaphylos spp.
Vaccinium spp.
Oxycoccus microcarpus

Herbs

Mountain avens
Cloudberry
Bistort

Stiff-stemmed saxifrage
Bog saxifrage
Wood rush
Fireweed

Dryas spp.
Rubus spp.
Polygonum bistorta spp.
plumosum
Saxifraga hieracifolia
S. hirculus
Luzula spp.
Epilobium angustifolium

Grasses and Sedges

Cottongrass
Polar grass

Bluejoint
Sedge

Eriophorum spp.
Arctagrostis latifolia var.
latifolia; var. *arundinacea*
Calamagrostis spp.
Carex spp.

Lichens, Mosses, Liverworts, and Fungi

Mosses

Lichens (reindeer moss)

Liverworts
Fungi

Sphagnum spp.
Dicranum spp.
Cladonia spp.
Cetraria spp.

ALPINE TUNDRA

Shrubs

Willows
Dwarf birch
Crowberry

Labrador tea
Lapland rosebay
Four angled heather
Lingonberry
Alpine blueberry
Bearberry
Alpine azalea
Cassiope

Salix spp.
Betula nana ssp. *exilis*
Empetrum nigrum ssp. *hermaphroditum*
Ledum palustre ssp. *decumbens*
Rhododendron lapponicum
Cassiope tetragona ssp. *tetragona*
Vaccinium vitis-idaea ssp. *minus*
V. uliginosum ssp. *alpinum*
Arctostaphylos spp.
Loiseleuria procumbens
Cassiope spp.

Herbs

Bistort
Saxifrages
Moss campion
Mountain avens
Louseworts
Oxytropes

Polygonum viviparum
Saxifraga spp.
Silene acaulis ssp.
Dryas spp.
Pedicularis spp.
Oxytropis spp.

Grasses and Sedges

Holy grass
Alpine Foxtail
Bluejoint
Grass
Poa grass
Fescue grass
Brome grass
Sedges

Hierochloë alpina
Alopecurus alpinus ssp. *alpinus*
Calamagrostis spp.
Trisetum spicatum ssp. *spicatum*
Poa spp.
Festuca spp.
Bromus Pampellianus ssp.
Carex spp.

Ferns and Fern Allies

Shield fern
Fragile fern
Alpine club moss
Spike moss

Dryopteris spp.
Cystopteris fragilis ssp. *fragilis*
Lycopodium alpinum
Selaginella sibirica

Lichens and Mosses

Lichens (reindeer moss)

Cladonia spp.
Cetraria spp.
Lecanora spp.
Physcia spp.
Sphagnum spp.

Mosses

BOTTOMLAND SPRUCE/HARDWOOD FOREST

Trees

White spruce
Balsam poplar

Alaska paper birch
Black spruce
Quaking aspen

Picea glauca
Populus balsamifera spp.
Balsamifera
Betula papyrifera ssp. *humilis*
Picea mariana
Populus tremuloides

Shrubs

Willows
Rose
Labrador tea
Lingonberry
Northern red current
Alder
Dogwood
Blueberry
High brush cranberry

Salix spp.
Rosa acicularis
Ledum palustre
Vaccinium vitis-idaea ssp. *minus*
Ribes triste
Alnus spp.
Cornus spp.
Vaccinium spp.
Viburnum edule

Herbs

Fireweed

River beauty
Willow herb

Epilobium angustifolium spp.
angustifolium
E. latifolium
E. palustre

Grasses and Sedges

Swedish dwarf cornel
Bluejoint

Cornus suecica
Calamagrostis spp.

Ferns and Fern Allies

Stiff club moss
Common club moss
Alpine club moss
Horsetail
Shield fern

Lycopodium annotinum ssp. *pungens*
L. clavatum ssp. *monostachyon*
L. alpinum
Equisetum spp.
Dryopteris dilatata ssp.
americana

Lichens and Mosses

Lichens (reindeer moss)

Mosses

Cladonia spp.
Cetraria spp.
Sphagnum spp.

LOW BRUSH/BOG MUSKEG

Trees

Black spruce
Tamarack

Picea mariana
Larix laricina

Shrubs

Cassandra
Sweet gale
Dwarf birch
Crowberry

Chamaedaphne calyculata
Myrica gale var. *tomentosa*
Betula nana ssp. *exilis*
Empetrum nigrum ssp. *hermaphro-*
ditum

Willows
Alpine blueberry
Bog cranberry
Bog rosemary
Blueberry
Alders
Soapberry

Salix spp.
Vaccinium uliginosum ssps.
Oxycoccus microcarpus
Andromeda polifolia
Vaccinium spp.
Alnus spp.
Shepherdia canadensis

Grasses and Sedges

Holy grass
Alpine foxtail
Polar grass

Hierochloë pauciflora
Alopecurus alpinus ssp. *alpinus*
Arctagrostis latifolia var.
latifolia

Bluejoint

Calamagrostis canadensis ssp.
canadensis

Pendent grass
Cotton grass
Sedges

Arctophila fulva
Eriophorum spp.
Trichophorum caespitosum
Carex spp.

Rushes

Juncus spp.
Tofieldia pusilla

Ferns and Fern Allies

Fir club moss
Horsetail

Lycopodium selago ssp. *selago*
Equisetum spp.

Lichens and Mosses

Lichens (reindeer moss)
Mosses

Cladonia spp.
Cetraria spp.
Sphagnum spp.

Trees

Alaska paper birch
White spruce
Quaking aspen
Balsam poplar
Black spruce

Betula papyrifera ssp. *humilis*
Picea glauca
Populus tremuloides
P. balsamifera ssp. *balsamifera*
Picea mariana

Shrubs

Willows
Rose
Northern red currant
Alder
Current
Lingonberry
Labrador tea

Salix spp.
Rosa acicularis
Ribes triste
Alnus spp.
Ribes spp.
Vaccinium vitis-idaea
Ledum palustre

Grasses and Sedges

Wheatgrass
Fireweed

Agropyron spp.
Epilobium angustifolium spp.
angustifolium

Ferns and Fern Allies

Shield fern
Alpine club moss
Horsetail

Dryopteris spp.
Lycopodium alpinum
Equisetum spp.

Lichens and Mosses

Lichens (reindeer moss)

Mosses

Cladonia spp.
Cetraria spp.
Sphagnum spp.

LOWLAND SPRUCE/HARDWOOD FOREST

Trees

Black spruce
Tamarack
White spruce
Alaska paper birch
Quaking aspen

Picea mariana
Larix laricina var. *alaskensis*
Picea glauca
Betula papyrifera ssp. *humilis*
Populus tremuloides

LOWLAND SPRUCE/HARDWOOD FOREST (Continued)

Shrubs

Dwarf birch
Shrub birch
Willow
Alpine blueberry
Bog cranberry
Crowberry

Rose
Lingonberry
Cloudberry
Northern red current

Betula nana ssp. *exilis*
B. glandulosa
Salix spp.
Vaccinium uliginosum ssp.
Oxycoccus microcarpus
Empetrum nigrum ssp. *hermaphroditum*
Rosa acicularis
Vaccinium vitis-idaea ssp. *minus*
Rubus chamaemorus
Ribes triste

Herbs

Fireweed

River beauty
Willow herb

Epilobium angustifolium ssp. *angustifolium*
E. latifolium
E. spp.

Grasses and Sedges

Bluejoint
Grass

Aklali grass
Fescue grass
Cotton grass
Sedges
Rushes
Wood rushes

Calamagrostis spp.
Trisetum spicatum
Beckmannia erucaeformis
Puccinellia spp.
Festuca spp.
Eriophorum spp.
Carex spp.
Juncus spp.
Lazula spp.

Ferns and Fern Allies

Club moss
Alpine club moss
Horsetail
Shield fern

Lycopodium spp.
L. alpinum
Equisetum spp.
Dryopteris dilatata ssp. *americana*

Lichens and Mosses

Lichens (reindeer moss)
Mosses

Cladonia spp.
Cetraria spp.
Sphagnum spp.

HIGH BRUSH

Trees

Alaska paper birch
White spruce
Balsam poplar

Betula papyrifera ssp. *humilis*
Picea glauca
Populus balsamifera ssp. *balsamifera*

Shrubs

Sitka alder
Mountain alder
Shrub birch
Willows
Bearberry
Labrador tea
Shrubby cinquefoil
Alaska spiraea
Lingonberry

Alnus crispa ssp. *sinuata*
A. crispa ssp. *crispa*
Betula glandulosa
Salix spp.
Arctostaphylos spp.
Ledum palustre
Potentilla fruticosa
Spiraea Beauverdiana
Vaccinium vitis-idaea ssp. *minus*
Rubus arcticus ssp. *arcticus*
Rosa acicularis
Cornus spp.
Rubus parviflorus

Prickly rose
Dogwood
Thimbleberry

Herbs

Fireweed

River beauty
Willow herb
Monkshood

Lupine
Jacob's ladder
Milk vetch
Shooting star

Epilobium angustifolium ssp.
angustifolium
E. latifolium
E. palustre
Aconitum delphinifolium ssp.
delphinifolium
Lupinus arcticus
Polemonium acutiflorum
Astragalus eucosmus seali
Dodecatheon frigidum

Grasses and Sedges

Polar grass
Bluejoint
Poa grass
Fescue grass
Brome grass
Wheatgrass
Sedges

Arctagrostis latifolia ssp.
Calamagrostis ssp.
Poa spp.
Festuca spp.
Bromus Pumpellianus
Agropyron spp.
Eriophorum spp.
Carex spp.

HIGH BRUSH Continued

Ferns and Fern Allies

Horsetail

Equisetum spp.

Mosses and Lichens

Lichens (reindeer moss)

Cladonia spp.

Cetraria spp.

Mosses

Sphagnum spp.

COASTAL WESTERN HEMLOCK/SITKA SPRUCE FOREST

True Forest

Western hemlock

Tsuga heterophylla

Sitka spruce

Picea sitchensis

Alaska cedar

Chamaecyparis nootkatensis

Western red cedar

Thuja plicata

Logpole pine

Pinus contorta var. *latifolia*

Shore pine

P. contorta var. *contorta*

Black cottonwood

Populus balsamifera ssp. *trichocarpa*

Paper birch

Betula papyrifera var. *commutata*

Quaking aspen

Populus tremuloides

Western yew

Taxus brevifolia

Mountain hemlock

Tsuga mertensiana

Pacific silver fir

Abies amabilis

Alpine fir

A. lasiocarpa

Shrubs

Red alder

Alnus oregona

Sitka alder

A. crispa ssp. *sinuata*

Thinleaf alder

A. incana ssp. *tenuifolia*

Devil's club

Echinopanax horridum

Rusty menziesia

Menziesia ferruginea

Salmonberry

Rubus spectabilis

Blueberry and huckleberry

Vaccinium spp.

Currant

Ribes spp.

Elder

Sambucus racemosa ssp. *pubens*
var. *arborescens*

Thimbleberry

Rubus parviflorus var. *grandiflorus*

COASTAL WESTERN HEMLOCK/SITKA SPRUCE FOREST Continued

Herbs, Mosses, and Others

Bunchberry
Deer cabbage
Licorice ferns
Horsetail
Sedge
Yellow skunk cabbage
Twisted stalk
Lichens
Liverworts
Mushrooms
Other fungi

Cornus canadensis
Fauria crista-galli
Polypodiaceae
Equisetum spp.
Carex spp.
Lysichiton americanum
Streptopus amplexifolius

GRASS-SEDGE MEADOW

Shrubs

Willows

Salix spp.

Grasses and Sedges

Beach ryegrass

Elymus arenarius ssp. *mollis*
var. *mollis*

Fescue grass

Festuca spp.

Bluejoint

Calamagrostis canadensis ssp.

Langsdorffii

Large-flowered spear grass

Poa eminens

Reed bent grass

Calamagrostis nutkaensis

Bent grass

Agrostis spp.

Manna grass

Glyceria pauciflora

Meadow barley

Hordeum brachyantherum

Arrow grass

Triglochin maritimum

Sedge

Carex spp.

Herbs

Beach pea

Lathyrus maritimus ssp.

Beach lovage

Ligusticum scoticum ssp.

Hultenii

Nootka lupine

Lupinus nootkatensis

Goose tongue

Plantago maritima ssp.

juncoides

Sea beach sandwort

Honckenya peploides ssp. *major*

Sea milkwort

Glaux maritima

Small bedstraw

Galium trifidum ssp.

Cleavers

G. aparine

Western buttercup

Ranunculus occidentalis

Yellow monkey flower

Mimulus guttatus

MUSKEG

Trees

Lodgepole pine
Alaska cedar
Mountain hemlock
Western hemlock
Sitka spruce

Pinus contorta var. *latifolia*
Chamaecyparis nootkatensis
Tsuga mertensiana
Tsuga heterophylla
Picea sitchensis

Shrubs

Crowberry
Labrador tea
Bog rosemary
Bog laurel

Empetrum nigrum ssp.
Ledum palustre ssp.
Andromeda polifolia
Kalmia polifolia ssp. *polifolia*

Herbs, Mosses and Others

Sphagnum
Sedge
Bulrush
Yellow skunk cabbage
Bracken fern

Sphagnum spp.
Carex spp.
Scirpus spp.
Lysichiton americanum
Pteridium aquilinum ssp.
longinosum

FRESHWATER LAKES, STREAMS AND PONDS

Algae

Numerous species of bluegreen, green,
golden algae, desmids and diatoms

Macrophytes

Pendent grass
Sedge
Cotton grass
Mare's tail

Grasses
Marsh fivefinger
Crowfoot
Moss
Bladderwort
Bur reed
Buckbean
Yellow pond lilly
Pond weeds
Marigold
Tundra grass
Water milfoil

Arctophila fulva
Carex sp.
Eriophorum sp.
Hippuris vulgaris
H. tetraphylla
Poa sp.
Potentilla palustris
Ranunculus sp.
Sphagnum sp.
Utricularia sp.
Sparganium hyperboreum
Menyanthes trifoliata
Najas polysepalum
Potamogeton spp.
Caltha sp.
Dupontia fisheri
Myriophyllum spicatum

COASTAL BRACKISH MARSH

Spike rush
Cottongrass
Pondweed
Sedges
Horned Pondweed
Horsetail
Cinquefoil
Reed bent grass
Sea milkwort
Alkali grass
Salt bush
Lyme grass
Sea arrow grass
Sand spurrey
Hairgrass
Lyngby's sedge

Eleocharis spp.
Eriophorum spp.
Potamogeton sp.
Carex spp.
Zarnichellia sp.
Equisetum palustre
Potentilla egedii
Calamagrostis spp.
Glaux maritima
Puccinellia spp.
Atriplex spp.
Elymus arenarius
Triglochin maritimum
Spergularia spp.
Deschampsia spp.
Carex lyngbyaei

SOURCE: University of Alaska, Arctic Environmental Information and Data Center 1974-76, Alaska Regional Profiles Vols. 1-6; Batten, Alan R. 1980, A Proposed Classification Framework for Alaskan Wetland and Aquatic Vegetation, Institute of Arctic Biology, University of Alaska; Huffman, R. R. and G. E. Tucker 1982, Draft Preliminary Guide to the Onsite Identification and Delineation of Wetlands of Alaska, U. S. Army Corps of Engineers Waterway Experiment Station, Vicksburg, Mississippi.

CHAPTER 80

POLICIES

APPENDIX C

NORTH SLOPE BOROUGH LAND MANAGEMENT REGULATIONS

19.80.010 Introduction The policies contained in this Chapter constitute the rules by which a Development other than a use-by-right is reviewed and approved or denied. They are reformatted from the Development Policies in the Comprehensive Plan, and the citations are to the relevant Development Policy in the Plan.

19.80.020 Mandatory Policies All Development must comply with each of the policies set out in Section 19.80.021 and 19.80.025 unless:

- (a) The Administrator determines that the policy is not applicable to the Development; or
- (b) The Commission grants a variance from the policy pursuant to Sections 19.60.060 et seq.

19.80.021 Prohibited Development The following Development is prohibited:

- * (a) Development which will likely result in depleting a subsistence resource, as set forth in Section 3.5.1 of the Plan, below the subsistence needs of local residents of the Borough. (3-1.1, 5-1.2)
- * (b) Drilling and other high-impact activities within the area of bowhead whale migration routes during the migration season. (3-3.1)
- * (c) Development that does not meet the standards of the Borough Coastal Management Program, when adopted, for management of Sensitive Areas such as estuaries, wetlands, tideflats, beaches, rivers, streams and lakes, permafrost landscape, and high energy ice impacted shorelines. (3-3.3)
- * (d) Deposition of toxic materials and untreated solid waste on the barrier islands, sea ice, artificial islands, at sea, in any wetlands, rivers or lakes which support or are capable of supporting significant populations of fish and wildlife. (3-7.1, 5-7.2)

- * (e) Development which precludes subsistence user access to subsistence resource. (3-1.4)
- (f) Development which significantly disturbs cultural or historic sites listed on the National Register of Historic Places or eligible for inclusion on the National Register. (4-1).
- * (g) Development which significantly interferes with traditional activities at cultural or historic sites identified in this Plan. (4-1).
- (h) Surface disturbance of newly discovered historic sites prior to archaeological investigation. (4-2)
- (i) Development which grossly violates guidelines on the rate or amount of growth adopted by a Village as a part of its Comprehensive Development Plan. (4-3)
- * (j) Mining during portions of the year when there would likely be substantial harm to the environment, such as the excessive silting of rivers and streams. (5-5.5)

- (k) Any development located outside the Prudhoe Bay Base Area, Pump Station 3, or the Chandalar Base Area, and tourist and recreational facilities located anywhere, within the Haul Road Corridor Special Area. (7-3)

19.80.025 Required Features The following policies are required for applicable development:

- * (a) Vehicles, vessels, and aircraft usage in Special Habitat Areas is required to be confined to corridors designated in the permit. (3-2.3)
- * (b) Offshore exploration, development and production drilling outside the landfast ice area (Plan Map 9, CMP Map I-2 and Plan Section 5.5.3.5 Zone AO) is required to be sited on a barrier island or artificial islands. A variance from this policy to allow offshore platforms will be granted only if the requirements of Sections 19.60.060 et seq. are met and, in addition, the Developer demonstrates the actual capability of the structure to withstand all natural forces, specifically including ice. (3-5.3)
- * (c) Development with water or airborne emissions is required to comply with all State Department of Environmental requirements. (5-5.2)

- * (d) Industrial and commercial development is required to be served by solid waste disposal facilities which meet state and federal regulations. (5-7.1)
- (e) Development not on a sewer system is required to impound and process effluent to state and federal quality standards. (5-7.3)
- * (f) Marine tankers to be utilized in offshore areas must be specially designed to withstand environmental hazards specifically including sea ice. (3-6.8).
- * (g) Residential development associated with industrial and resource extraction development must be removed when the industrial or extractive use is completed unless pursuant to Plan policies removal is more harmful than non-removal. (5-3.2, 3-8.3)
- (h) Development in a Village is required to be consistent with the relevant Village Comprehensive Development Plan, when adopted. (3-8.1)

19.080.030 Best Efforts Policies All Development must comply with each of the policies set out in Sections 19.80.031 and 19.80.032 unless:

- (a) The Administrator determines that the policy is not applicable to the Development; or
- (b) The Administrator determines that the Developer has used his best efforts to comply with the policy and that there is no feasible and prudent alternative to the proposed compliance:

19.80.031 Prohibited Development

- * (a) Development that will likely result in significantly decreased productivity of subsistence resources or their ecosystems. (3-1.2)
- * (b) Development which restricts subsistence user access to a subsistence resource (3-1.3, 3-7.4)
- * (c) Development within Special Habitat Areas identified in Section 10.4.1 of this Plan. (3-2.1)
- * (d) Resource extraction uses within a Special Habitat Area. (3-2.2)
- * (e) Development in Sensitive Areas such as estuaries, tideflats, beaches, rivers, streams and lakes, and high energy ice impacted shorelines. (3-3.2)

- * (f) Facility siting, drilling or other high-impact activities at Barrier Islands that are intensively used by Beluga whales as feeding and resting areas as identified on CMP Map II-3. (3-3.4)
- * (g) Development on a shoreline that does not require a shoreline location, landfills, fuel or toxic material storage areas and dumps on or near a shoreline. (3-4.2, 5-2.3)
- (h) Public highway development, except for village roads and streets and highways indicated in the Capital Improvements Program. (3-6.3)
- * (i) Transportation development including pipelines which significantly obstructs wildlife migration. (3-6.5)
- * (j) Development to accomodate petroleum transportation via marine tankers. (3-6.6)
- * (k) Duplicative transportation corridors from resource extraction sites to tidewater or railroads. (3-6.7)
- (l) Development associated with purely recreational uses of land and wildlife habitat, such as commercial hunting and fishing camps or lodges and recreational second home subdivisions. (3-9.1, 6-2.2.1)

- (m) Development of tourist facilities except as provided for pursuant to a Village Comprehensive Plan. (3-9.2, 6-2.2.2)
- (n) Development which significantly violates guidelines on the rate or amount of growth adopted by a Village and adopted as a part of its Comprehensive Development Plan. (4-3)
- * (o) Development which substantially pollutes the natural environment (including water, air, noise and vibration). (5-1.1)
- * (p) Development in flood plains and other geologic hazard areas. (5-4.1)
- * (q) Siting, design, construction, and maintenance of transportation and utility facilities (including ice roads) are required to minimize alteration of shorelines, water courses, wetlands, and tidal marshes and significant disturbance to special habitat; and to avoid critical fish migration periods. (7-5)
- * (r) Disturbance of subsistence resource habitat, or migration routes during migration periods, by transportation modes or development. (7-4)

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- (s) Resource development which uses suppliers or subcontractors from outside the Borough for work which can be accomplished competitively by local private businesses or regional or village corporations. (8-2.2)
 - (t) Resource development which will not significantly employ local Borough residents, unless residents of the local village expresses no interest in the work. (8-1.2)

19.80.032 Required Features The following features are required of applicable Development:

- * (a) Industrial and commercial development and resource extraction development are required to be located, designed, and maintained in a manner that prevents significant adverse impacts upon subsistence resources and their habitat, including water circulation and drainage patterns and coastal processes. (3-4.3, 3-5.1)
- * (b) Resource extraction development for administration, operations, residence and other uses not absolutely required in the field is required to be located in a designated service base which is sited, designed, constructed and

maintained to be as compact as possible; and to share facilities to the maximum extent possible. (5-5.1)

- * (c) Development is required to maintain the natural permafrost insulation quality of existing soil and vegetation. (5-4.3)
- (d) New subdivisions or other residential development near the shoreline or in Special Habitat Areas are required to provide adequate water and sewer service to prevent damage to the environment and habitat of subsistence species. (5-3.1, 3-8.2)
- * (e) Mining on beaches or offshore is prohibited unless no alternatives exist for extraction of the resource, and in those circumstances substantial alteration of shoreline dynamics is prohibited. (5-5.6)
- * (f) Independent verification by a Borough approved agent is required for a developer's environmental assessment and design and engineering criteria for offshore development outside the landfast ice zone. [Plan Map 9, CMP Map I-2 and Section 5.5.3.5 Zone AO of this Plan] (5-4.5)

- * (g) Transportation facilities for resource development and extraction are required to be consolidated to the maximum extent possible. (7-1)

19.80.040 Minimization of Negative Impacts Applicable development is required to minimize its impact on the following features:

- * (a) Airports and helicopter pads are required to be sited, designed, constructed and operated to minimize their impact upon significant wildfowl migration routes, breeding grounds and nesting areas. (7-2, 3-6.1)
- * (b) Siting, design, construction and maintenance of transportation and utility facilities (including ice roads) are required to minimize alteration of shorelines, water courses, wetlands, and tidal marshes and significant disturbance to special habitat; and to avoid critical fish migration periods. (3-6.2, 3-4.1, 3-7.2, 5-2.2, 5-6.2, 5-7.4)
- * (c) When linear structures such as roads and pipelines are located in areas used as corridors by migratory species of wildlife, a means of crossing shall be included for those migratory species. Pipelines shall be designed, using the best available information, to minimize disruptions of migratory patterns and other major movements of wildlife. Above ground pipelines shall be elevated a minimum of

five (5) feet, except at those points where the pipeline intersects a road, pad or caribou ramp. (3-6.4)

- (d) Development in floodplains, shoreline areas, and offshore is required to be sited, designed and constructed to minimize loss of life or property due to oceanic storms, sea waves, ice gouging and override, and shore erosion. (5-4.2)

- * (e) Mining and mineral processing in the coastal area is required to be designed and conducted to minimize impacts on subsistence species habitat, land and water resources, and general environmental conditions. (5-5.3)

19.80.050 Beneficial Impacts The Administrator will consider the following features when making the determination set forth in Section 10.60.030.

- * (a) The joint siting and use of facilities, and the concentration of development. (3-5.2, 5-2.1)
- * (b) Accommodation of free cross-migration of tuttu by pipelines. (3-6.4)

- * (c) Design and maintenance of residential development associated with industrial and resource extraction which provides for employees to be shuttled into the area for work periods then outside to their permanent residence. (3-8.4, 5-3.3)
- * (d) Development of not more than the minimum number of borrow pits to serve all Development in an area. (5-5.4)
- * (e) Incorporation of utilities and multimodal transportation facilities in a single corridor. (5-6.1, 7-6)
- (f) Employment of local Borough residents. (6-1.1, 8-1.1)
- (g) Utilization of flexible employment procedures to allow subsistence pursuits by local Borough resident employees. (6-1.2, 8-3, 6-3.3)
- (h) Incorporation of job training programs for local Borough residents. (6-1.3)
- (i) Development which related to or encourages Inupiat arts and crafts. (6-2.1)
- (j) Development which provides local employment in the villages. (6-3.1)

- (k) Utilization of local private businesses or village or regional corporations as suppliers or subcontractors. (6-3.2, 8-2.1)
- (l) Development which provides or materially contributes to lower cost fuel or power to adjacent villages. (6-4.1, 6-5)
- (m) Utilization of locally obtained energy (such as locally produced coal and natural gas) or renewable sources of energy. (6-4.2)
- *(n) Resource extraction development that is consistent with subsistence resources and the Inupiat culture and Inupiaq character of life. (9-1)
- (o) Excess of tax revenues over demand for expenditures. (9-2)

APPENDIX

INFORMATION SOURCES

BIBLIOGRAPHY

- Alaska Fisheries Development Foundation 1982. Fisheries of Alaska 1981. Natural Resources Consultants.
- Alaska Geographic Society 1981. Alaska National Interests Lands, Alaska Geographic Society 8(4).
- Alaska State Department of Community and Regional Affairs, Division of Community Planning 1979. Regional Community Profiles.
- Alaska State Department of Fish and Game 1981. Land at River's End, the Copper River Delta. Chugach National Forest.
- Alaska State Department of Environmental Conservation, 1982. How to get your Corps permit for projects in or near Alaska's waters and wetlands. Dames and Moore Consultants.
- Alaska, State of, Legislative Affairs Agency 1981. Handbook on Alaska State Government.
- Alaska State Department of Natural Resources, Division of Minerals and Energy Management 1982. Five-Year Oil and Gas Leasing Program Mid-Year Edition.
- . 1982. Oil and Gas Leasing Regulations and Statutes.
- Alaska State Power Authority 1982. The Susitna Hydro Studies.
- Alaska State Office of Coastal Management 1981. Wetlands Management in Alaska: A report to the Alaska Coastal Policy Council.
- . 1982. Local planning for wetlands management. A manual for districts in the Alaska Coastal Management Program.
- . 1979. State of Alaska Coastal Management Program and Final Environmental Impact Statement. U. S. Department of Commerce, Office of Coastal Zone Management.

Alaska Water Study Committee, 1981. Anticipating Water and Related Land Resource Needs. Final Report of the Southcentral Alaska Water Resources Study.

Arneson, Paul D., Sept. 1980. Identification, Documentation and Delineation of Coastal Migratory Bird Habitat in Alaska. Alaska State Department of Fish and Game.

Atlantic Richfield Company, Jan. 1983. Responses to Draft Alaska Wetland Regulation Case Study. Letter to Office of Technology Assessment

Banfield, A.W.F., R. D. Jakimchuk and R. D. Cameron, April 1982. An assessment of issues concerning caribou and North Slope petroleum development. Caribou Advisory Council Final Report.

Batten, Alan R., 1980. A proposed classification framework for Alaskan wetland and aquatic vegetation. U. S. Forest Service.

Bergman, R. D., R. L. Howard, K. F. Abraham and M. W. Weller 1977. Waterbirds and their wetland resources in relation to oil development at Storkersen Point, Alaska. U. S. Fish and Wildlife Service Resource Publication 129.

Bromley, Dennis D. 1981. Potter Marsh, Anchorage's Wildlife Haven. The Northern Institute for Research, Training, & Development Inc.

Brown, Jerry Editor, 1975. Ecological Investigations of the Tundra Biome in the Prudhoe Bay Region, Alaska. Biological Papers of the University of Alaska, Special Report No. 2.

Bucaria, Garran Pat, Katherine Howard and Keven McKaughan 1979. Copper River Delta Area Wildlife Resource Review. Chugach National Forest, U. S. Forest Service.

Bundtzen, T. K., G. R. Eakins and C. N. Conwell 1982. Review of Alaska's Mineral Resources. State of Alaska Department of Commerce and Economic Development.

Bureau of Land Management 1978. Proceedings of the symposium on surface protection through prevention of damage on the Arctic Slope, Anchorage, Alaska.

Bureau of Land Management 1982. Draft Environmental Impact Statement on Oil and Gas Leasing in the National Petroleum Reserve in Alaska.

- Cameron, R. D., K. R. Whitten, W. T. Smith and D. D. Roby 1979. Caribou Distribution and Group Composition Associated with Construction of the Trans-Alaska Pipeline. *Can Field Nat* 93:155-162.
- Cameron, R. D. and K. R. Whitten, 1979. Seasonal Movements and Sexual Segregation of Caribou determined by aerial survey, *J. Wildl. Manage.* 43(3):626-633.
- _____. 1980. Influence of the Trans-Alaska Pipeline Corridor on the local distribution of caribou. *Proceedings of the Second International Reindeer/Caribou Symposium, Røros, Norway.*
- Cameron, R. D., K. R. Whitten and W. T. Smith 1981. Distribution and movements of caribou in relation to the Kuparuk Development Area. Third Interim Report, Alaska Department of Fish and Game.
- Cameron, R. D. and K. R. Whitten 1982. Caribou and Petroleum Development: Compatibility or Conflict? *Alaska J.* 12:28-32.
- Curalto, James, A., S. M. Murphy and M. A. Robus, Feb. 1982. Caribou responses to the pipeline/road complex in the Kuparuk oil field, Alaska, 1981. Final Report. Arco Alaska Inc.
- Derksen, Dirk V., Thomas C. Rothe and William Eldridge 1981. Use of Wetland Habitats by Birds in the National Petroleum Reserve - Alaska. U. S. Fish and Wildlife Service Resource Publication 141.
- Environmental Protection Agency. 1982. Review of the 404 permit program in Alaska. Unpublished report.
- Hogan, Mary E. and William A. Colgate 1980. Birds of Coastal Habitats in Port Valdez and Valdez Arm, Alaska. U. S. Fish and Wildlife Service.
- Hok, Jerome R., 1969. A reconnaissance of tractor trails and related phenomena on the north slope of Alaska. Bureau of Land Management.
- Huffman, R. T. and G. E. Tucker, 1981. Preliminary guide to the onsite identification and delineation of the wetlands of Alaska. U. S. Army Corps of Engineers Waterway Experiment Station, Vicksburg, Miss.
- King, James G. and Calvin J. Lensin, 1971. An evaluation of Alaskan Habitat for Migratory Birds. U. S. Bureau of Sport Fisheries and Wildlife.

L.G.L. Ecological Research Associates, Sept. 1982. The Kuparuk oil field ecosystem - a literature summary and synthesis, and an analysis of impact research. Arco Alaska Inc.

Municipality of Anchorage, Department of Community Planning, 1982. Anchorage Wetlands Management Plan.

North Slope Borough, 1979. Interim Zoning Ordinance. North Slope Borough Code Title 19.

Nunn, Colonel Lee, 1982. Letter response to inquiry from Office of Technology Assessment and from Senate Committee on the Environment and Public Works.

Racine, Charles H., 1977. Tundra Disturbance resulting from a 1974 drilling operation in the Cape Espenberg Area, Seward Peninsula, Alaska, U. S. Department of the Interior, National Park Service.

Reynolds, Patricia, 1978. Effects of Seismic Activity on Vegetation. Bureau of Land Management.

Ritchie, Robert, James Curatolo and Allan Battan, 1981. Knik Arm Wetlands Study. U. S. Fish and Wildlife Service.

Shepard, Stan, Keith Bennett and James K. Gilliam, 1982. National Petroleum Reserve in Alaska, Technical Examination. An analysis of the type and likely level of NPR-A oil developments. Bureau of Land Management.

Sitka, City of, 1981. Coastal Management Program Summary.

Sundberg, Kimbal A., 1981. Sitka Coastal Habitat Evaluation Final Project Summary with Management recommendations. Alaska Department of Fish and Game.

Tieszen, Larry L. Ed., 1978. Vegetation and Production Ecology of the Alaskan Arctic Tundra. New York:Springler-Verlag, Ecol. Studies 29.

Trasky, Lance, 1982. Kachemak Bay: Alaska's most productive seafood waters? Alaska Business, September 1982.

U. S. Army Corps of Engineers, Alaska District, n.d. Protecting Alaska's Waters. Informational Brochure.

- U. S. Army Corps of Engineers, Alaska District, 1978. Wetlands of Potter Marsh.
- U. S. Army Corps of Engineers, Alaska District, 1980. Final Environmental Impact Statement, Prudhoe Bay Oil Field Waterflood Project Vols. 1-3.
- U. S. Army Corps of Engineers, July 22, 1982. Interim Final Rule for Regulatory Programs of the Corps of Engineers, Fed. Reg. 47(141): 31794-31834.
- U. S. Congress, 1971-79 Public Laws 92-203, 93-153, 94-204, 94-456, 95-600, 96-55, Alaska Native Claims Settlement Act and Amendments. U. S. Government Printing Office.
- U. S. Congress, December 2, 1980. Public Law 96-487, Alaska National Interest Lands Conservation Act. U. S. Government Printing Office.
- U. S. Congress, Subcommittee on Environmental Pollution of the Committee on Environment and Public Works, United States Senate, July, 1982. Hearings on Section 404 of the Clean Water Act. U. S. Government Printing Office, Washington, D. C.
- U. S. Fish and Wildlife Service, n.d. What you should know before you build, drain, dredge or fill in wetland. Informational brochure.
- U. S. Fish and Wildlife Service and Alaska Department of Environmental Conservation, 1979. Proceedings of a Wetlands Conference, Anchorage, Alaska.
- U. S. Fish and Wildlife Service, 1981. Memo to U. S. Army Corps of Engineers regarding illegal fills and violations of Section 404 program.
- U. S. Fish and Wildlife Service, 1982. Draft Environmental Impact Statement and Draft Regulations. Proposed oil and gas exploration within the Coastal Plain of the Arctic National Wildlife Refuge, Alaska.
- U. S. Forest Service Draft Environmental Impact Statement, Chugach National Forest Plan, 1982.
- U. S. Geological Survey, 1979. An Environmental Evaluation of Potential Petroleum Development on the National Petroleum Reserve in Alaska, Department of the Interior.

University of Alaska, Arctic Environmental Information and Data Center,
1972. Environmental Atlas of the Greater Anchorage Area Borough,
Alaska.

University of Alaska, Arctic Environmental and Information Data Center,
L. L. Selkegg, editor, 1974. Alaska Regional Profiles: Vol. 1
Southcentral Region.

———. 1975. Alaska Regional Profiles: Vol. 2, Arctic Region.

———. 1976a. Alaska Regional Profiles: Vol. 5, Northwest
Region.

———. 1976b. Alaska Regional Profiles: Vol. 6, Yukon Region.

———. 1976c. Alaska Regional Profiles: Vol. 3, Southwest
Region.

———. 1976d. Alaska Regional Profiles: Vol. 4, Southeast
Region.

———. 1978. Environmental Atlas of Alaska.

Walker, D. A., K. R. Everett, P. J. Webber and J. Brown, 1980.
Geobotanical Atlas of the Prudhoe Bay Region, Alaska. U. S. Army
Corps of Engineers' Cold Regions Research and Engineering
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